1672

W. D. Pickman

CHAPTER V. OF THE LIBRARY.

The Library Committee shall divide the books and other articles belonging to the Library into three classes, viz.: (a) those which are not to be removed from the building; (b) those which may be taken from the halls only by written permission of three members of the committee, who shall take a receipt for the same and be responsible for their safe return; (c) those which may circulate under the following rules.

Members shall be entitled to take from the Library one folio, or two quarto volumes, or four volumes of any lesser fold, with the plates belonging to the same, upon having them recorded by the Librarian, or Assistant Librarian and promising to make good any damage they sustain, while in their posession, and to replace the same if lost, or pay the sum fixed by the Library Committee.

No person shall lend any book belonging to the Institute, excepting to a member, under a penalty of one dollar for every such offence.

The Library Committee may allow members to take more than the allotted number of books upon a written application, and may also permit other persons than members to use the Library, under such conditions as they may impose.

No person shall detain any book longer than four weeks from the time of its being taken from the Library, if notified that the same is wanted by another member, under a penalty of five cents per day, and no volume shall be retained longer than three months at one time under the same penalty.

The Librarian shall have power by order of the Library Committee to call in any volume after it has been retained by a member for ten days.

On or before the first Wednesday in May, all books shall be returned to the Library, and a penalty of five cents per day shall be imposed for each volume detained.

Labels designating the class to which each book belongs shall be placed upon its cover.

No book shall be allowed to circulate until one month after its reception.

A

KEY,

CONTAINING

ANSWERS TO THE EXAMPLES

IN THE

SEQUEL TO

INTELLECTUAL ARITHMETIC.

BY WARREN COLBURN, A. M.

BOSTON:

HILLIARD, GRAY, LITTLE, AND WILKINS.

1829.

DISTRICT OF MASSACHUSETTS, TO WIT:

District Clerk's Office.

BE IT REMEMBERED, That on the eleventh day of May, A. D. 1827, in the fifty-first year of the Independence of the United States of America, HILLIARD, GRAY, LITTLE, AND WILKINS, of the said district, have deposited in this office the title of a book, the right whereof they claim as proprietors, in the words following, *to wit:*

"A Key, containing Answers to the Examples in the Sequel to Intellectual Arithmetic. By WARREN COLBURN, A. M."

In conformity to the act of the Congress of the United States, entitled, "An Act for the encouragement of learning, by securing the copies of maps, charts, and books, to the authors and proprietors of such copies, during the times therein mentioned:" and also to an act, entitled, "An Act supplementary to an act, entitled, An Act for the encouragement of learning, by securing the copies of maps, charts, and books, to the authors and proprietors of such copies during the times therein mentioned; and extending the benefits thereof to the arts of designing, engraving, and etching historical and other prints."

JNO. W. DAVIS,
Clerk of the District of Massachusetts.

ADVERTISEMENT.

THE Key contains the answers to all the examples in the Sequel; and occasional remarks, showing how to solve the questions, and how to use the book. Of course it is intended only for the use of instructers, and of those who wish to teach themselves. Great care will be taken to prevent improper persons from obtaining it. Those who wish for it must make personal application to the publisher.

KEY.

I.

Answers to the Examples in Art. 1.

1. Twenty seven.
2. Thirty five.
3. Fifty eight.
4. Sixty three.
5. Seventy
6. Eighty four.
7. Ninety six.
8. One hundred.
9. One hundred and three.
10. One hundred and ten.
11. One hundred and thirteen.
12. One hundred and twenty seven.
13. Three hundred and eight.
14. Five hundred and twenty.
15. Seven hundred and thirty eight.
16. One thousand.
17. One thousand, and one.
18. One thousand, and ten.
19. One thousand, one hundred.
20. One thousand, and eighteen.
21. Two thousand, one hundred and seven.
22. Three thousand, two hundred and fifty.
23. Five thousand, seven hundred and ninety six.
24. Ten thousand.
25. Twenty thousand, and thirty.

26. Fifty thousand, seven hundred and five.
27. Sixty seven thousand, and eighty three.
28. Three hundred thousand, and fifty.
29. Four hundred and seventy six thousand, and eighty nine.
30. Seven hundred and seven thousand, seven hundred and twenty.
31. One million, three hundred and seventy.
32. Five millions, six hundred thousand, and seventy three.
33. Eight millions, eighty one thousand, three hundred and five.
34. Fifty nine millions, six thousand, three hundred and forty one.
35. Three hundred and five millions, eight hundred and seventy thousand, four hundred.
36. Five hundred and ninety millions, forty seven thousand, six hundred and eight.
37. One billion.
38. Three billions, six hundred and seventy millions, three hundred and eighty seven.
39. Forty five billions, seven millions, seventy thousand and seven.
40. Six hundred and eighty billions, nine hundred and thirty millions, one hundred thousand, seven hundred.
41. Fifty trillions, seven hundred and eighty seven billions, six hundred and fifty seven millions, five hundred.
42. Two hundred and seventy trillions, eight hundred and thirty eight millions, three thousand, nine hundred and eight.
43. Sixty eight millions, nine hundred and seven thousand, six hundred and five.
44. Fifty six billions, thirty four thousand, seven hundred and fifty.
45. Six trillions, seven hundred and three billions, seven hundred and twenty millions, eight hundred and fifty seven.

Answers to the numbers, to be written in figures.

1.	- -	34	19.	- -	500,071
2.	- -	57	20.	- -	207,600
3.	- -	63	21	-	4,060,084
4.	- -	80	22.	-	97,035,805
5.	- -	100	23.	-	50,070,008
6.	- -	101	24.	-	300,000,057
7.	- -	110	25.	-	2,053,305,200
8.	- -	311	26.	-	50,207,067,200
9.	- -	517	27.	-	87,000,063
10.	- .	850	28.	-	600,000,207,003
11.	- -	986	29.		35,000,009,000,058
12.	- -	1,001	30.		657,007,000,097,067
13.	- -	1,010	31.	-	70,250,367
14.	- -	3,101	32.		407,000,000,087,000
15.	- -	5,060	33.	-	35,000,098,100
16.	- -	10,005	34.	-	40,200,074
17.	- -	30,504	35.	-	83,763,957
18.	- -	67,040			

II.

Addition.

1	-	79 dollars	12.	228 yards.	1,432 dollars
2.	-	85 trees	13	- -	814 guns
3.	- -	209 dollars	14.	- -	7,850 men
4.	- -	109 trees	15.	- -	537 pounds
5.	- -	365 days	16.	- -	8 dollars
6.	- -	1,387 miles	17.	- -	25 dollars
7.	- -	878 dollars	18.	- -	157 dollars
8.	- -	156 times	19.	- -	66 years
9.	- -	506 dollars	20.	- -	66 years
10.	- -	5,919 dollars	21.	- -	531 dollars
11.	-	43,440 dollars	22.	- -	3,487 dollars

23.	2,716 years	29.	3,879,379 inhabitants
24.	A. D. 1783	30.	906,617 do.
25.	A. D. 1799	31.	9,625,734 do.
26.	2,358 years	32.	922,837
27.	1,659,854 inhabitants	33.	9,726,064
28.	3,179,884 do.	34.	99,043,624

III.

Multiplication.

1.	54 dolls.	20.	696 gills
2.	78 dolls.	21.	252 quarts
3.	56 cents	22.	1,008 quarts
4.	85 cents	23.	504 pints
5.	95 dolls.	24.	1,008 pints
6.	141 dolls.	25.	2,016 gills
7.	120 dolls.	26.	8,064 gills
8.	104 dolls.	27.	34 quarts
9.	686 dolls.	28.	39 pints
10.	7,146 dolls.	29.	231 gals.
11.	513 trees	30.	756 quarts
12.	304 yds.	31.	791 pints
	2,128 dolls.	32.	6,927 gills
13.	2,713 dolls.	33.	403 dolls. 20 cents
14.	126 dolls.	34.	16 dolls. 59 cents
15.	756 dolls.	35.	2,352
16.	16 cents	36.	6,640
17.	1 quart 40 cents	37.	786,924
	1 gal. 1 dol. 60 cents	38.	19,896
18.	20 dolls. 16 cents	39.	5,743,066
19.	174 pints	40.	65,260,340

IV.

1.	- -	1,026 dolls.	27.	- -	9,525
2.	- -	1,218 dolls.	28.	- -	33,318
3.	- -	1,344 dolls.	29.	- -	84,056
4.	- -	1,455 dolls.	30.	- -	140,192
5.	each	126 dolls.	31.	- -	418,670
	whole	2,520 dolls.	32.	- -	769,608
6.	- -	2,100 dolls.	33.	- -	34,650
7.	- -	416 dolls.	34.	- -	7,380
8.	1 year	1,664 dolls.	35.	- -	55,824
	2 years	3,328 dolls.	36.	- -	483,924
9.	- -	168 hours	37.	- -	2,163,942
10.	-	1,440 minutes	38.	- -	196,112
11.	-	10,080 minutes	39.	- -	8,001
12.	- -	1,416 hours	40.	- -	22,176
13.	- -	504 miles	41.	- -	116,397
14.	- -	264 miles	42.	- -	442 dolls.
15.	- -	3,456 miles	43.	- -	1,479 dolls.
16.	-	2,368 gallons	44.	-	20 dolls. 1 cent
17.	- -	1,656 dolls.	45.	-	3 dolls. 64 cents
18.	-	525,960 minutes	46.	-	22 dolls. 42 cents
19.	- -	832 days	47.	-	23 dolls. 31 cents
20.	in 24 h'rs	12,960 miles	48.	- - -	328
	in 15 days	194,400 m.	49.	- - -	703
21.	- - -	1,218	50.	- - -	2,436
22.	- - -	4,815	51.	- - -	4,794
23	- - -	7,408	52.	- - -	7,828
24.	- - -	4,950	53.	- - -	14,758
25.	- - -	3,024	54.	- - -	11,774
26.	- - -	50,568	55.	- - -	47,905

V.

1.	- -	50 cents	3.	- 50 dolls. 40 cents
2.		120 dolls.	4.	- - - 70 days

5.	87 dolls. 30 cents	23.	50
6.	800 dolls.	24.	470
7.	2,700 dolls.	25.	300
8.	30 cents	26.	1,240
9.	50 dimes. 500 cents	27.	3,870
10.	1,700 cents	28.	4,500
11.	830 mills	29.	130,080
12.	75,300 cents	30.	700
13.	1,000 mills	31.	3,800
14.	84,000 mills	32.	9,000
15.	753 cents	33.	4,000
16.	18,314 cents	34.	73,000
17.	283,438 mills	35.	80,000
18.	8,246,256 mills	36.	132,000
19.	$45.30	37.	800,000
20.	$2.70	38.	1,643,000
21.	$845	39.	7,250,000
22.	$350	40.	764,380,000

VI.

1.	$15.00	12.	$105.00
2.	$202.50	13.	in 7 miles 2,240 rods in 10 miles 3,200 " in 30 miles 9,600 " in 500 m. 160,000 "
3.	$54,000		
4.	1,290 days		
5.	5,810 men		
6.	in an hour 3,600 times in a day 86,400 " in a week 604,800 "	14.	680
		15.	17,100
		16.	15,000
7.	623 seconds	17.	1,935,000
8.	443 minutes	18.	320,560
9.	4,783 minutes	19.	8,120,000
10.	718,459 seconds	20.	198,400,000
11.	$384,000	21.	107,200,000

VII.

1.	- - -	$714	16.	- -	$2561.625
2.	- -	$218.62	17.	- -	$107.125
3.	- -	$24.32	18.	- -	$5075.00
4.	- -	$636.48	19.	- -	$22,503.78
5.	- -	$478.50	20.	- -	$61,362.875
6.	- -	$565.50	21.	- -	$434,112.00
7.	- -	$139.20	22.	- -	- 41,689
8.	in 1 day	80 miles	23.	- -	1,575,000
	in 15 days	1,200 "	24.	- -	309,848
9.	- -	$932.75	25.	- -	15,105,150
10.	- -	$2702.90	26.	- -	103,804,200
11.	- -	$3053.74	27.	-	18,720,000,000
12.	- -	$1819.65	28.	-	216,004,605,056
13.	in 1 day	192 miles	29.	-	362,600,000,000
	in 127 d.	24,384 "	30.		23,552,810,540,300
14.	- -	$1,238,550	31.		30,271,411,995,340
15.	- -	$679,620			

Miscellaneous Examples.

1.	- -	$31.36	14.	- -	$13.296
2.	- -	- $3.36	15.	-	- 66,705 grains
3.	- -	- $28	16.	-	- 55,799 grains
4.	- -	- 112 lb.	17.	- -	- $25.37
5.	- -	- 10 qrs.	18.	- -	- $5.37
6.	- -	- 102 lb.	19.	- -	- $10.53
7.	- -	- 252 lb.	20.	- -	$537.50
8.	- -	- 219 lb.	21.	- -	- $70.56
9.	- -	- 288 oz.	22.	-	126,230,400 sec.
10.	- -	21,504 oz.	23.	-	261,171,837 sec.
11.	- -	26,680 oz.	24.	- -	42 months
12.	- -	- $36.72	25.	-	1713 days
13.	- -	- $34.12	26.	- -	165,936 min.

27. - - - ———
28. 57,497,947,200 sec.
29. - - $262.68
30. - - $1972.32
31. - 30,363,840 miles
32. - - 2268 men
33. - - 705 days
34. - - 7905 men
35. - - 522 hours
36. - - 2821 days
37. 1848 days / 3318 men
38. - - 108 yards
39. - - - $269
40. - 520 penny loaves
41. - - $731.74
42. - - - $51.43
43. - - - $0.78
44. - - - $2.58
45. - - - $7.85
46. for 2 years $0.12 / for 5 years $0.30
47. - - - $51.87
48. - - - $3000
49. - - $177.50
50. - - $324.50
51. on $5 $3.40 / on $20 $13.60
52. on $47, $34.31 / on $123, $89.79 / on $2500, $1825
53. gained $36.45 / sold them for $279.45
54. - - $1036.89

VIII.

Subtraction.

1. - - 5 peaches
2. - - - $6
3. - - 18 apples
4. - - - $19
5. - - - $29
6. - - - $48
7. - - 27 years
8. - - 37 years
9. - - 64 years
10. - - 48 yards
11. - - - $23
12. - - - $115
13. - - - $92
14. - - $666
15. - - $1236
16. - 13 miles
17. - 180 miles
18. - 67 years
19. - A. D. 1706
20. horses $466 / horses more than carriage $79
21 - - $3823
22. - - $11,608
23. - 80,428 inhabitants
24. - increase 10,028

25 - - - $114
26. - - $4562
27. - - - $0.925
28. A received $4150.88
29. - - $220.50
30. { he lost $151.20 / he sold it for $1738.80
31. { he spends $1193.55 / he saves $642.45
32. - - 462,365
33. - - 292,999
34. - - 36,996,322
35. - - - 8,844
36. - - - 1,956
37. - - - 1,973
38. - - 51,494
39. - - 159,927
40. - - - $999
41. - - $999.83
42. - - 800,047
43. - - 159,930
44. - - - 9,877
45. - - $840.86
46 - - 80,547
47 - - $14,146.58
48. - - $1117.53
49. - - $999.99

IX.

Division.

1. - - 6 oranges
2. - - 9 barrels
3. - - 14 bushels
4. - - 14 barrels
5. - - - $16
6. - - 21 pence
7. - - - 10 lb.
8. - - - 14 lb.
9. - - - 17 lb.
10. - - - 20 cwt.
11. - - - 23 cwt.
12. - - . 19 cwt.
13. - - - 7 lb.
14. - - - 8 yds.
15. - - - 4 oz.
16. - - 7 bushels
17. - - - 11 yds.
18. - - - 33 lb.
19. - - - 61 qts.
20. - - £1 18s.
21. - - £2 13s.
22. - - £4 7s.
23. - - £5 15s.
24. - - £8 18s.
25. - - £12 13s.
26. - - £312 7s.
27. - - 3s. 2d.
28. - - 12s. 9d.
29. - - 123s. 10d.
30. - - 2236s. 10d.
31. - - 22d. 1qr.
32. - - 60d. 3qr.

33. - - 941d.
34. - 2s. 10d. 1qr.
35. - 7s. 11d. 2qr.
36. - £1 10s. 10d.
37. - £3 10s. 6d.
38. - £16 1s. 6d.
39. - £2 8s. 9d.
40. - £90 17s. 9d. 1qr.
41. - 10 gals. 3 qts. 1 pt.
42 - 28 gals. 3 qts.
43. - 12 qts. 2 gls.
44. 5 gals. 2 qts. 1 pt. 3 gls.
45 131 gals. 3 qts. 1 gill
46. - 745 gals. 3 qts.
47. - 2 hhds. 22 gals.
48. 15 T. 1 hhd. 30 gals.
49. 6 T. 12 gals. 2 qts.
50. - 14 min. 33 sec.
51. 3 days 15 hours
52. 2mo. 2 w. 3 d.
53. - 1 d. 21 h. 38 min.
54. - 10 mo. 1 w.
55. - - 16 y. 24 d.
56. - 1 lb. 1 oz. 1 dr.
57. 19 lb. 13 oz. 7 dr.
58. - - - 1 ton
59. 156 T. 1 cwt. 0 qr. 2 lb. 6 oz.
60. 16 dwt.
61. 16 oz. 5 dwt.
62. 35 lb. 11 oz.
63. 34 lb. 5 oz. 19 dwt. 10 gr.
64. 117 lb. 9 oz. 7 dwt. 10 gr.
65. 2 yds. 1 qr. 1 nl.
66. 4 E. Eng. 1 qr. 3 nls.
67. 15 yds. 0 qr. 3 nls.
68. 124 E. Flem.
69. 258 E. Flem. 2 qr. 3 nls.
70. 15 guineas 12s.
71. 11 six-pences and 2d. over
72. 16 eight-pences and 2d. over
73. 85 four-pences and 2d. over
74. 231 nine-pences and 7d. over
75. 1938d.
76. 329 three-pences.
77. £121 0s. 9½d.
78. 42 guineas, and 24s. 1d. over
79. 240 three-pences

80. 243 dolls. and 2s. over
81. 80 guineas
82. 124 dollars
83. 72d.
84. 5 dolls. and 1s. 10d. over
85. 108 dolls. and 4d. over
86. 17 E. Flem. 1 qr.
87. 2 E. Eng. 1 qr.
88. 10 aunes 1 qr.
89. 91 yds. 1 qr.
90. In a little more than 26 days
91. £9 2s. 6d.
92. 50 spoons and 8 dwt. over
93. 3lb. 3 oz.
94. 27 coats
95. 168 bottles
96. 144 of each kind
97. 7 of each sort
98. 15 of each sort
99. 23 bushels of each sort.
100. - 36 of each sort
101. - - 2840 boxes
102. - - 329 qqls.
103. - - 24 barrels
104. - - 30 bushels
105. - - 348 lb.
106. - - 7yds.
107. - - 856 times
108. - - 4291 times
109. - - 9604 times
110. - - 290 times
111. - - 3669 times
112. - 16,212 times
113. - 11,807 times
114. - - 5337 times
The dividend in this example should have been 80,055
115. - - 731 times
116. - - 52 times
117. - - 37 times
118. - - 33 times
119. - - 94 times
120. - - 38 times
121. - - 75 times
122. - - 29 times
123. - - 365 times
124. - - 826 times

125. - - 9405 times
126. - - 7638 times
127. - 134,092 times
128. - 1,003,245 times

Miscellaneous Examples.

1. - - 12s. 9d.
2. - - - 9s.
3. - - 10s. 6d.
4. - - £1 4s. 9d.
5. - - £2 13s.
6. - - £7 6s. 8d.
7. - - £20 10s.
8. - - - £21
9. - 1 qr. 15 lb. 5. oz.
10. - - £24 3s.
11. - - £10 8s. 4d.
12. 7 cwt. 3 qrs. 11 lb.
13. 14 cwt. 3 qrs. 13 lb.
14. 19 cwt. 3 qrs. 8 lb.
15. 58 cwt. 1 qr. 20 lb.
16. - - £6 12s.
17. - £28 0s. 0d.
18. - - £7 16s. 4d.
19. - - £2 13s. 4d.
20. - - £4 17s. 9d.
21. - - £11 7s. 6d.
22. - - £36 16s. 8d.
23. - per lb. £4 1s. for the whole £10 9s. 3d.
24. - - £88 0s. 8d.
25. - - 12s. 9d.
26. - - 2 lb. 9 oz.
27. - - 1 T. 18 cwt.
28. - - £13 11s. 4d.
29. - 51 gals. 1 qt. 1 pt.
30. - 83 yds. 3 qrs. 1 nl.
31. 47 bu. 3 pks. 4 qts.
32. - - £7 17s. 8d.
33. 17 cwt. 3 qrs. 25 lb.
34. - 15 yds. 2 qrs.
35. - - 45 gals. 1 qt.
36. - - - 2s. 3d.
37. - - - £9 1s.
38. - - 7 yds. 3 qrs.
39. - - 14 yds. 2 qrs.
40. - - 8 lb. 13 oz.
41. - . 11s. 9d. 2qr.
42. - - £1 3s. 4d.
43. - 9 cwt. 1 qr. 15 lb.
44. - 43 cwt. 1 qr. 24 lb.
45. - 3 cwt. 2 qrs. 12 lb.
46. 23 yds. 1 qr. 2 nls.
47. - 7 yrs. 9 mo. 1 d.
48. - 8th March 1815
49. 4th June, 0 h. 36 min. 24 sec.

X.

1. $1
2. $1
3. $125 will buy 62½ lb.
4. ⅓ bu. will cost 1s. ⅔ bu. will cost 2s.
5. $28 will buy 9⅓ bbls.
6. 41⅔ boxes
7. 226⅔ bottles
8. $1, $2, $3
9. ¼ &c., 4¾ boxes
10. 81¼ barrels
11. $1, $2, &c.
12. ⅛ &c., 7⅘ weeks
13. 90⅗ bbls.
14. $1, $2, $5, $7, $11
15. for $56, 9⅜ reams
16. 72⅝ bbls.
17. from Boston to New-York in 35⅖ hours
18. 9⅜ chaldrons
19. 50¾ reams
20. 347⅓ bbls.
21. 425⅖ bbls.
22. 106⅛ cords
23. $5\frac{1}{17}$ lb. $11\frac{13}{17}$ lb. $52\frac{3}{17}$ lb.
24. $\frac{1}{28}$ cwt. $\frac{3}{28}$ cwt. $\frac{8}{28}$ cwt. $\frac{18}{28}$ cwt. $95\frac{13}{28}$ cwt.
25. $15\frac{7}{28}$ tons
26. $\frac{1}{32}$, $\frac{3}{32}$, $\frac{7}{32}$, $\frac{14}{32}$, $\frac{27}{32}$, $2\frac{23}{32}$, $26\frac{21}{32}$
27. $38\frac{43}{48}$ gals. for $17.53
28. $\frac{1}{138}$ T. $\frac{17}{138}$ T. $\frac{36}{138}$ T. $\frac{87}{138}$ T. $1\frac{14}{138}$ T. $6\frac{47}{138}$ T. $199\frac{32}{138}$ T.
29. $\frac{1}{875}$ &c., $10\frac{575}{875}$ bbls.
30. - - $47\frac{23}{73}$ galls.
31. - - $34\frac{17}{875}$ cwt.
32. - - $22\frac{96}{132}$ days
33. - - $199\frac{36}{121}$ days
34. - - - $66\frac{1}{2}$ lb.
35. - - - $32\frac{1}{3}$ bushels

36.	$48\frac{21}{23}$ lb.	46.	$940\frac{7}{9}$
37.	$15\frac{1}{3}$ bushels	47.	$204\frac{8}{14}$
38.	$37\frac{4}{5}$ gals.	48.	$1559\frac{4}{27}$
39.	$6\frac{44}{63}$ hours	49.	$354\frac{34}{78}$
40.	$\frac{1}{51}$ bu. $\frac{8}{51}$ bu. $\frac{12}{51}$ bu. $13\frac{13}{51}$ bu.	50.	$5782\frac{27}{153}$
		51.	$415\frac{244}{457}$
41.	$41\frac{24}{100}$ gals.	52.	$399\frac{274}{2467}$
42.	$74\frac{108}{138}$ gals.	53.	$123\frac{6097}{13841}$
43.	$22\frac{602}{750}$ bbls.	54.	$1011\frac{209139}{405006}$
44.	$196\frac{1}{4}$	55.	$8014\frac{1308}{12478}$
45.	$359\frac{1}{5}$		

XI.

1.	$8\frac{7}{10}$ lb.	12.	$387\frac{6}{10}$
2.	$35\frac{4}{10}$ lb.	13.	$4\frac{73}{100}$
3.	16 lb.	14.	$67\frac{83}{100}$
4.	$24\frac{3}{10}$ boxes	15.	$487\frac{69}{100}$
5.	$74\frac{9}{10}$ chald.	16.	\$$4753\frac{84}{100}$
6.	$43\frac{73}{100}$ bu.	17.	$5710\frac{648}{1000}$
7.	$324\frac{87}{100}$ boxes	18.	$176487\frac{4}{10}$ cts.
8.	$243\frac{84}{100}$ lb.		$17648\frac{74}{100}$ d.
9.	$24\frac{763}{1000}$ bbls.		\$$1764\frac{874}{1000}$
10.	$87\frac{3487}{10000}$ tons	19.	\$$4710\frac{74}{1000}$
11.	$7\frac{8}{10}$		

XII.

1.	$\frac{3}{5}$	3.	$\frac{10}{7}$
2.	$\frac{4}{7}$	4.	$\frac{4}{5}$

5.	$\frac{3}{4}$	39.	$\frac{1}{32}$ gal.
6.	$\frac{19}{7}$	40.	$\frac{7}{32}$ gal.
7.	$\frac{9}{17}$	41.	$\frac{23}{32}$ gal.
8.	$\frac{17}{9}$	42.	$\frac{1}{63}$ hhd. $\frac{17}{63}$ do.
9.	$\frac{17}{35}$	43.	$\frac{1}{2016}$ hhd. $\frac{43}{2016}$ do.
10.	$\frac{34}{17}$	44.	$\frac{574}{2016}$ hhd.
11.	$\frac{4}{67}$	45.	$\frac{1}{28}$ qr. $\frac{13}{28}$ qrs.
12.	$\frac{67}{4}$	46.	$\frac{1}{16}$ lb. $\frac{11}{16}$ lb.
13.	$\frac{17}{105}$	47.	$\frac{1}{256}$ lb. $\frac{15}{256}$ lb.
14.	$\frac{102}{17}$	48.	$\frac{219}{256}$ lb.
15.	$\frac{39}{256}$	49.	$\frac{1}{7168}$ qr. $\frac{431}{7168}$ qr.
16.	$\frac{256}{39}$	50.	$\frac{4536}{7168}$ qr.
17.	$\frac{138}{287}$	51	$\frac{1}{12}$ yr. $\frac{7}{12}$ yr. $\frac{11}{12}$ yr.
18.	$\frac{8473}{38649}$	52.	$\frac{1}{30}$ mo. $\frac{3}{30}$ mo. $\frac{17}{30}$ mo.
19.	$\frac{3906}{907384}$	53.	$\frac{1}{60}$ h. $\frac{17}{60}$ h.
20.	$\frac{96483}{384}$	54.	$\frac{1}{1440}$ day, $\frac{13}{1440}$ day
21.	$\frac{1}{4}$d. $\frac{2}{4}$d. $\frac{3}{4}$d.	55.	$\frac{463}{1440}$ day
22.	$\frac{1}{12}$s. $\frac{2}{12}$s. $\frac{3}{12}$s. &c. $\frac{11}{12}$s.	56.	$\frac{1}{86400}$ day, &c.
23.	$\frac{1}{48}$s. $\frac{2}{48}$s. $\frac{3}{48}$s. &c. $\frac{35}{48}$		$\frac{348}{86400}$ day
24.	$\frac{7}{48}$s. $\frac{9}{48}$s. $\frac{38}{48}$s.	57.	$\frac{49437}{86400}$ day
25.	$\frac{1}{20}$£, $\frac{2}{20}$£, &c. $\frac{17}{20}$	58.	$\frac{1}{31557600}$ yr.
26.	$\frac{1}{240}$£, $\frac{3}{240}$£, &c. $\frac{147}{240}$£		$\frac{8724}{31557600}$ yr.
27.	$\frac{29}{240}$£	59.	$\frac{10691005}{31557600}$
28.	$\frac{88}{240}$£	60.	$\frac{1}{99}$, $\frac{8}{99}$, $\frac{49}{99}$
29.	$\frac{164}{240}$£	61.	$\frac{63}{201}$
30.	$\frac{227}{240}$£	62.	$\frac{43}{100}$ dol.
31.	960 qrs.	63.	$\frac{72}{500}$ dol.
32.	$\frac{1}{960}$£, $\frac{3}{960}$£, &c. $\frac{487}{960}$£	64.	$\frac{1}{60}$£ $\frac{17}{60}$£
33.	$\frac{31}{960}$£	65.	$\frac{1}{1200}$, $\frac{11}{1200}$, $\frac{56}{1200}$
34.	$\frac{46}{960}$£	66.	$\frac{162}{1055}$
35.	$\frac{221}{960}$£	67.	$\frac{810}{3221}$
36.	$\frac{658}{960}$£	68.	$\frac{1}{12}$
37.	$\frac{1}{4}$ gal.	69.	$\frac{31}{63}$
38.	$\frac{1}{8}$ gal.	70.	$\frac{79}{321}$

71.	-	-	-	$\frac{34}{11}$	78.	-	-	-	$\frac{4}{5}$
72	-	-	-	$\frac{5}{4350}$	79.	-	-	-	$\frac{8}{5}$
73.	-	-	-	$\frac{316}{435}$	80.	-	-	-	$\frac{9}{38}$
74.	-	-	-	$\frac{376887}{7998}$	81.	-	-	-	$\frac{28}{9}$
75.	-	-	-	$\frac{2240}{3531}$	82.	-	-	-	$\frac{96}{117}$
76.	-	-	-	$\frac{360}{669}$	83.	-	-	-	$\frac{294}{37}$
77.	-	-	-	$\frac{2165}{3669}$	84.	-	-	-	$\frac{9432}{36873}$

In taking the ratio of one number to another, some make the first mentioned number the numerator. I have preferred the method given, because it is the one used by Lacroix. It is not important which is used, provided it be understood.

XIII.

1.	It will take $\frac{4}{3} = 1\frac{1}{3}$ bbls.			12.	-		-	$8\frac{6}{10}$ lb.
	to last 4 weeks, and $\frac{17}{3} =$			13.	-		-	8 lb. 6 oz.
	$5\frac{2}{3}$ bbls. to last 17 weeks			14.	-		-	$11\frac{14}{28}$ guin.
2.	It will take $\frac{11}{7} = 1\frac{4}{7}$ bbl.			15.	-			11 guin. 14s.
	to last 11 weeks, and $\frac{28}{7}$			16.	-		-	$19\frac{2}{24}$ days
	= 4 bbls. to last 28 weeks			17.	-		-	19 d. 20 h.
3.	- $\frac{11}{7} = 1\frac{4}{7}$; $\frac{28}{7} = 4$			18.	-		-	$162\frac{17}{60}$ hours
4.	$\frac{57}{13} = 4\frac{5}{13}$ chaldrons			19.	-			162 h. 17 min.
5.	-	-	- $4\frac{5}{13}$	20.	-			$120\frac{42}{365}$ years
6.	-	-	- $3\frac{13}{17}$ bu.	21.	-		-	120 yr. 42 d.
7.	-	-	- $3\frac{13}{17}$	22.	-			$254\frac{1830}{4747}$ years
8.	-	-	- £$19\frac{7}{20}$	23.	-		-	$10\frac{37}{45}$
9.	-	-	- £19 7s.	24.	-		-	$100\frac{53}{87}$
10.	-	-	- $36\frac{5}{12}$s.	25.	-		-	$4\frac{711}{784}$
11.	-	-	36s. 5d.	26.	-		-	$740\frac{92460}{243291}$

XIV.

1. 7 days, 21 days, 91 days
2. $1 = \frac{7}{7}$, $3 = \frac{21}{7}$, $13 = \frac{91}{7}$
3. 8 days, 57 days, 107 days, 349 days
4. $1 = \frac{8}{8}$, $7\frac{1}{8} = \frac{57}{8}$, $13\frac{3}{8} = \frac{107}{8}$, $43\frac{5}{8} = \frac{349}{8}$
5. 34 weeks, 202 weeks
6. $13\frac{7}{15} = \frac{202}{15}$
7. 402 men, 2486 men
8. $\frac{402}{577}$
9. $\frac{2486}{577}$
10. $\frac{123}{8}$ bu.
11. $\frac{395}{17}$ bbls.
12. $\frac{53}{12}$s. or 53d.
13. $\frac{167}{20}$£, or 167s.
14. $\frac{371}{24}$ day
15. 371 hours
16. $\frac{1063}{60}$
17. 1063 min.
18. $\frac{821}{112}$ cwt.
19. 821 lb.
20. $\frac{43119}{237}$ cwt.
21. $\frac{3655}{15}$
22. $\frac{4809}{11}$
23. $\frac{17978}{2644}$

XV.

1. $\$4\frac{1}{2}$
2. $6\frac{3}{7}$ bu.
3. $37\frac{1}{3}$ bbls.
4. $17\frac{3}{5}$ tons
5. $\$2\frac{9}{20}$
6. $\$6\frac{6}{17}$
7. $\$6\frac{9}{20}$
8. $\$24\frac{9}{23}$
9. $\$21\frac{11}{18}$
10. $\$60\frac{48}{101}$
11. $\$261\frac{45}{101}$
12. $\$37\frac{1}{3}$
13. $\$108$
14. $\$330\frac{1}{4}$
15. £28 $11\frac{6}{37}$s.
16. £62 $5\frac{38}{87}$s.
17. £16$\frac{173}{212}$
18. £35$\frac{424}{987}$
19. $\$31\frac{1}{3}$
20. $\$57\frac{6}{17}$, $\$117$
21. $\$206\frac{64}{100}$
22. $\$573\frac{154}{288}$
23. $2\frac{6}{17}$
24. $11\frac{91}{211}$

25. - - - $2\frac{96}{375}$
26. - - - $1\frac{1407}{2885}$
27. - - - $\frac{7525}{17854}$
28. - - - $5\frac{334424}{486638}$
29. - - - $1\frac{1179}{2878}$
30. - - - $1\frac{9679}{18405}$
31. - - $59\frac{5283}{17063}$
32. - - $5\frac{7576291}{1893700}$

XVI.

1. - - - $12
2. - $\frac{1}{3}$ of $36, $12
3. - $\frac{1}{7}$ of $1.54, $0.22
4. - $\frac{1}{9}$ of $126, $14
5. - $\frac{1}{17}$ of $136, $8
6. - - - $163
7. captain $4620
   1st mate $3080
   2d mate $2310
   sailors $539 each
8. - - 285 miles
9. - - $13.64
10. - - - $11.73
11. - $0.61, $1.22
12. - - $31.33
13. - - - $0.48
14. $1.05, $3.15, $7.35
15. - $1.65, $17.05
16. - $1.50, $26.25
17. $1.55, $3.10, $4.65
18. - - $23.20
19. - - - 14.10
20. - - $1.13, $5.65
21. - - $148.03
22. - $\frac{1}{7}$ of $2.94, $0.42
23. $\frac{1}{8}$ of $60.24, $7.53
24. $\frac{1}{12}$ of $82.44, $6.87
25. $\frac{1}{16}$ of $1692.00 $94
26. $\frac{1}{37}$ of $2.96 $0.08
27. $\frac{1}{63}$ of $52.92, $0.84
28. - - $427.42
29. - - 63,360 in.
30. - 21,600 geo. miles
31. - - 24,912 miles
32. - 950,400 in.
33. - 7,971,840 rods
34. 4,735,272,960 b. corns
35. - - - $1.25
36. $\frac{1}{8}$ of 18 bu. $\frac{5}{6}$ of 18 bu.
    15 bu.
37. in 53 h. 265 miles
38. - - 1480 miles
39. - - - $222
40. - - 235 miles
41. $1.43; $90.09; $294.58
42. - - $191.70
43. - - - $7.05
44. - - $63.52
45. - - £3 11s 4d.
46. - - $99.75

47. - - 55 bu. 1 pk. 53. - - $11.20
48. - - - £213 54. - - $13,625\frac{4}{15}\frac{0}{6}$
49. - - - $56 55. 7167 & a fraction over
50. - - - $93.75 56. - - $64,984\frac{7}{11}\frac{2}{7}\frac{0}{0}$
51. - - - $220 57. - $\frac{1}{3}$ bu. $\frac{2}{3}$ bu.
52. - - £17 14s. 9d. 58. - - $\frac{1}{5}$ bu. $\frac{3}{5}$ bu.

59. $\frac{1}{5}$ gal. $\frac{2}{5}$ gal. $\frac{3}{5}$ gal. $1\frac{4}{5}$ gal.

60. $\frac{1}{7}$; $\frac{2}{7}$; $\frac{3}{7}$; $\frac{7}{7} = 1\frac{3}{5}$

61. $\frac{1}{7}$ $\frac{2}{7}$; $\frac{5}{7}$; $\frac{1}{7}^{0} = 1\frac{3}{7}$ dolls.

62. $\frac{1}{7}$; $\frac{2}{7}$; $\frac{5}{7}$; $\frac{1}{7}^{0} = 1\frac{3}{7}$

63. $\frac{1}{13}$ gal. $\frac{2}{13}$ gal. &c. $\frac{23}{13} = 1\frac{10}{13}$ gal. $\frac{57}{13} = 4\frac{5}{13}$ gals.

64. $\frac{1}{13}$; $\frac{2}{13}$, &c. $\frac{57}{13} = 4\frac{5}{13}$

65. $\frac{1}{23}$dol. $\frac{2}{23}$dol. &c. $\frac{34}{23} = 1\frac{11}{23}$, $\frac{87}{23} = 3\frac{18}{23}$dols. $\frac{253}{23} = 11$ dols.

66. $\frac{1}{23}$, $\frac{2}{23}$, &c. $\frac{87}{23} = 3\frac{18}{23}$, $\frac{253}{23} = 11$

67. $\frac{53}{8} = \$6\frac{5}{8}$; $\$86.12\frac{4}{8}$

68. $8\frac{7}{17}$ cts.

69. $\$6.31\frac{44}{97}$

70. $\$66.92\frac{7}{211}$

71. $\$532.83\frac{15}{63}$

72. $\$856.66\frac{48}{189}$

73. $\frac{2}{3}$ bu. $3\frac{1}{3}$ bu.

In doing these examples, make the pupil learn to *express* division, as explained in the book, Part II. Art. XVI.

74. $\frac{5}{8}$ bbl. $10\frac{5}{8}$ bbls.

75. $\frac{5}{23}$ bbl. $16\frac{7}{23}$ bbls.

76. $\frac{3}{43}$ acre, $\frac{21}{43}$ acre, $1\frac{41}{43}$ acre, $10\frac{39}{43}$ acres

77. $\frac{495}{39}$ pk. $\frac{49500}{39} = 1706\frac{26}{39}$ pks. $= 426$ bu. $2\frac{26}{39}$ pks.

78. $\frac{37}{136}$ rood. $\frac{37}{136} \times 500 = \frac{18500}{136} = 136\frac{4}{136}$ roods $= 34$ acres, $0\frac{4}{136}$ roods.

79. 1 man will consume $\frac{96}{435}$ bbl. and $\frac{96}{435} \times 2426 = 535\frac{171}{435}$ bbls. Or 1 man will consume $\frac{1}{435}$ of 96 bbls. and 2426 men will consume $\frac{2426}{435}$ of 96 bbls.

Ans. $535\frac{171}{435}$ bbls.

80. - - - 5.43\frac{3}{8}$
81. - - 12.54\frac{1}{8}$
82. - - - 12s.
83. - - - 9d.
84. - - - 7$\frac{4}{8}$d.
85. - - - 2$\frac{3}{8}$ qrs.
86. - - - 7$\frac{1}{8}$d.
87. - - 6d. 3$\frac{1}{4}$ qrs.
88. - - - 7s. 6d.
89. - 14s. 3d. 1$\frac{1}{4}$ qrs.
90. - 4s. 3d. 1$\frac{1}{4}$ qrs.
91. 13 h. 42 min. 51$\frac{3}{7}$ sec.
92. - 22 min. 30 sec.
93. 9 h. 13 min. 50$\frac{1}{13}$ sec.
94. 6 h. 43 min. 12 sec.
95. - - - 6 oz.
96. - - 2 qrs. 8 lb.
97. 1 qr. 4 lb. 15$\frac{1}{17}$ oz.
98. - 17 galls. 2 qts.
99. 8 galls. 2 qts. 1 pt. 2$\frac{3}{19}$ gills.
100. - 2 qrs. 1$\frac{1}{7}$ nls.
101. - 3 qrs. 1$\frac{1}{11}$ nl.
102. - 1 qr. 1$\frac{1}{11}$ nl.
103. - - 0.428\frac{3}{7}$
104. - - 0.178\frac{1}{28}$
105. - - 0.127\frac{3}{4}$
106. - 7s. 9d. 3$\frac{1}{3}$ qrs.
107. - 7s. 6d. 3$\frac{2}{37}$ qrs.
108. - - 9s. 7$\frac{5}{73}$d.
109. 1 qt. 1 pt. 3$\frac{1}{87}$ gills.
110. - - - 6$\frac{6}{83}$d.
111. - - 16 hours
112. - - $0.20
113. - - 3$\frac{3}{5}$ qrs.
114. - 1 pk. 5$\frac{17}{43}$ qts.
115. - 7 oz. 12$\frac{2}{37}$ dr.
116. - 5s. 3d. 1$\frac{2}{87}$ qrs.

117. 12s. 9$\frac{30}{130}$ d.
118. 8s. 6d. 3$\frac{123}{287}$ qrs.
119. 1 qr. 5 lb. 11 oz. 15$\frac{14}{82}$$\frac{9}{3}$ drs.
120. 2 d. 16 h. 8 min. 17$\frac{91}{124}$$\frac{9}{73}$ sec.
121. 22 gals. 3$\frac{24}{68}$$\frac{2}{4}$ qts.
122. In this example find $\frac{2}{47}\frac{3}{7}\frac{3}{7}$ of a hhd. in galls. and then multiply the price of 1 gall. by it; or first find the price of 1 hhd. and take $\frac{2}{47}\frac{3}{7}\frac{3}{7}$ of that. The latter method is generally preferable. *Ans.* 37.85\frac{73}{477}$.
123. 8.10\frac{10}{642}$
124. $350.
125. 63.66\frac{13}{38}$
126. 260.06\frac{1}{4}$
127. 2174.88\frac{16}{43}$
128. 4231.65\frac{21}{37}$

129. 4 bushels will come to 20s. then 3 pks. 5 qts. = 29 qts. = $\frac{29}{32}$ bu. $\frac{29}{32}$ of 5s. = 4s. $6\frac{12}{32}$d. *Ans.* £1 4s. $6\frac{12}{32}$d.

130. 3 cwt. will come to \$27; 2 qrs. 7 lb. = $\frac{63}{112}$ cwt $\frac{63}{112}$ of \$9 = \$5.06$\frac{28}{112}$ *Ans.* \$32.06$\frac{28}{112}$

131. \$1348.50

132. \$28.86$\frac{28}{224}$

133. $\frac{747}{4432}$d. per grain. This multiplied by the number of grains in an ounce will give the price of an ounce. Ans. 6s. $8\frac{4900}{4432}$d.

134. \$1.19$\frac{7501}{10021}$

135. Reduce the 34 tons, &c. to pounds, and make it the denominator, and \$6500.00 the numerator of a fraction; this will be the price of 1 pound in parts of a cent. Multiply this by the number of pounds in a ton, and reduce it, and it will be the answer. Ans. \$188.49$\frac{5542}{7124}$

136. \$0.055 per lb.

137. \$4.055$\frac{5}{8}$ per yd.

138. \$0.244$\frac{100}{100}$ per lb.

139. - \$1.56 per gal.

140. - - - \$325

141. \$1.507$\frac{59}{63}$ per gal.

142. - \$6.50 per bbl.

143. - \$6.685$\frac{5}{35}$ per yd.

144. - \$0.36 per gal.

145. - \$0.178$\frac{448}{784}$ per lb.

146. \$0.028$\frac{1}{7}\frac{15}{84}\frac{2}{4}$ per lb.

147. It will take 1 boarder 8 times as long, that is, 96 days; and it would take 12 boarders $\frac{1}{12}$ part of that time, or 8 days. Ans. 8 days.

148. - - 92 men

149. - - 42 men

150. - - $14\frac{12}{7}$ days.

151. - - $11\frac{7}{35}$ days

152. - - 12 days

153. - - $20\frac{4}{13}$ days

154. - $27\frac{15}{25}$ miles

155. - - $33\frac{4}{9}$ bu.

156. Find how many men it would take, if the days were one hour long, and then how many, when they are 11 hours. Ans. 15 men.

157. Find how many months it would take them, if they worked only 1 hour in a day, and then how many, if they worked 10 hours. Ans. $3\frac{5}{10}$ months.

158. A's share \$576, B's \$288

159. A's share $\$2994.008\frac{6}{48}$
B's do. $\$3346.244\frac{18}{48}$
C's do. $\$2113.417\frac{24}{48}$

160. Both together paid \$8, B paid $\frac{5}{8}$, and C $\frac{3}{8}$ of it. They ought to receive in the same proportion.

161. \$100. C $\frac{47}{100}$ and D $\frac{53}{100}$
C's share $29\frac{61}{100}$ galls. D's $33\frac{39}{100}$ galls.

162. C's share $\frac{850}{29979}$ of $\$1353.18 = \$386.103\frac{2163}{29979}$
D's do. $\frac{942}{29979}$ of do. $= \$427.893\frac{2313}{29979}$
E's do. $\frac{11187}{29979}$ of do. $= \$539.182\frac{1482}{29979}$

163. A's share $\$1397.653\frac{745}{3835}$
B's do. $\$5241.199\frac{1835}{3835}$
C's do. $\$3843.546\frac{1090}{3835}$
D's do. $\$2620.599\frac{2835}{3835}$
E's do. $\$297.001\frac{1165}{3835}$

164. F's share \$3277.50
G's do. \$6397.50
H's do. \$5325

165. The first $\$9.333\frac{6}{18}$
The second \$14
The third $\$18.666\frac{12}{18}$

166. A receives $\$179.777\frac{724}{5788}$
B " $\$402.187\frac{644}{5788}$
C " $\$914.295\frac{540}{5788}$
D " $\$1476.740\frac{880}{5788}$

The last nine examples are what is usually called *Simple Fellowship*, for which we deduce the following rule:—Find the stock invested, and make it the denominator, and each man's particular share the numerator of a fraction. These fractions will express each man's proportion of the sum to be received or to be paid.

167. - $18106\frac{1086}{28665}$

168. - - $22\frac{4632}{48775}$

169. - - - $\frac{159}{1864}$

170. - - - $1\frac{2841}{9775}$

171. - - - $2\frac{4}{8}\frac{8}{1}\frac{3}{4}$
172. - - - $3\frac{4}{8}\frac{4}{8}\frac{9}{4}$
173. - - $677\frac{1}{3}\frac{3}{5}\frac{9}{6}$
174. - - $677\frac{1}{3}\frac{3}{5}\frac{9}{6}$
175. - - $29\frac{1}{2}\frac{9}{3}\frac{3}{7}$
176. - - $29\frac{1}{2}\frac{9}{3}\frac{3}{7}$
177. - - $133\frac{4}{1}\frac{4}{0}\frac{6}{0}\frac{6}{0}$
178. - - $133\frac{4}{1}\frac{4}{0}\frac{6}{0}\frac{6}{0}$
179. - - $18\frac{1}{1}\frac{2}{3}\frac{1}{0}\frac{9}{5}$
180. - - $18\frac{1}{1}\frac{2}{3}\frac{1}{0}\frac{9}{5}$

XVII.

1. - - - $\frac{1}{5}$ dol.
2. - $\frac{2}{5}$ dol. $3\frac{1}{5}$ dols.
3. - - $\frac{1}{5}$ bbl.
4. - $\frac{3}{17}$ ton. $1\frac{4}{17}$ ton
5. - - $\$10\frac{4}{5}\frac{4}{0}$
6. - - - $\$30\frac{1}{5}$
7. - - 137$\frac{3}{5}$ shil.
8. - $7\frac{4}{5}$ bu. 390 bu.
9. - - $126\frac{4}{5}$ bu.
10. - - - $\$107\frac{3}{5}$
11. - - $5\frac{3}{11}$ miles
12. - - $59\frac{3}{5}$ miles
13. - - $5\frac{3}{11}$ bu.
14. - - - $\$7\frac{3}{5}$
15. - - $\$24\frac{6}{1}\frac{4}{0}\frac{4}{0}$

Observe that in all the above examples, the division may be performed by dividing the numerator. In most of those which follow this cannot be done.

16. - $\frac{1}{4}$ of a melon
17. - $\frac{1}{6}$ of the apple
18. - $\frac{3}{8}$ of a bushel
19. - - - - $\frac{3}{8}$
20. - - $\frac{1}{6}$ bushel
21. - - - $\frac{1}{6}$
22. - - - $\frac{1}{10}$ bbl.
23. - - - $\frac{1}{10}$
24. - - $\frac{3}{1}\frac{3}{2}$ bbl.
25. - $\frac{3}{1}\frac{3}{2}$
26. - $\frac{3}{3}\frac{3}{7}$ dol.
27. - - $\frac{3}{3}\frac{3}{7}$
28. - $\frac{3}{4}\frac{3}{7}$ dol.

29. $\frac{1}{6}$ dol. $\frac{2}{6}$ dol. $\frac{7}{6} = 1\frac{1}{6}$ dol.
30. $\frac{1}{6}$. $\frac{2}{6}$. $\frac{7}{6} = 1\frac{1}{6}$
31. $\frac{3}{3}\frac{3}{5}$ dol. $\frac{1}{3}\frac{5}{5}$ dol. $\frac{4}{3}\frac{5}{5} = 1\frac{1}{3}\frac{4}{5}$ dol.
32. $\frac{3}{3}\frac{3}{5}$. $\frac{1}{3}\frac{5}{5}$. $\frac{4}{3}\frac{5}{5} = 1\frac{1}{3}\frac{0}{5}$
33. $\frac{1}{1}\frac{3}{2}\frac{3}{0}$ of the loss

34. He sold $\frac{12}{275}$. He owned at first $\frac{3}{25}$ of the whole. $\frac{1}{25} = \frac{11}{275}$ and $\frac{3}{25} = \frac{33}{275}$; out of these he sold $\frac{12}{275}$, consequently he had $\frac{21}{275}$ left. Ans. He sold $\frac{12}{275}$, and had $\frac{21}{275}$ left.

35. $5\frac{1}{2} = \frac{11}{2}$; $\frac{1}{3}$ of $\frac{11}{2}$ is $\frac{11}{6}$, and $\frac{2}{3}$ of $\frac{11}{2}$ is $\frac{22}{6} = 3\frac{4}{6}$. Ans. $3\frac{4}{6}$ dollars

36. $1\frac{4}{6}$. $3\frac{4}{6}$

37. $1\frac{5}{12}$ bu. $4\frac{3}{12}$ bu.

38. $1\frac{5}{12}$. $4\frac{3}{12}$, or $4\frac{1}{4}$

39. $\$145\frac{26}{65} = \$145.305\frac{75}{65}$

40. $145\frac{26}{65}$

41. $\frac{1099}{384}$ dol. $\frac{1099}{10752}$ dol. $= \$0.102\frac{2396}{10752}$

42. $59\frac{1}{16}$ gals.

43. $50.00

44. $\$15\frac{45}{152} = \$15.296\frac{8}{152}$

45. $\$\frac{16}{120}$. $\$\frac{752}{1134} = \$0.663\frac{158}{1134}$

46. $\$3\frac{28}{60} = 3.648\frac{32}{60}$

47. $\$2\frac{40}{252} = \$2.952\frac{96}{252}$

48. $\$16\frac{8}{60} = \$16.133\frac{20}{60}$

49. $\$4\frac{37}{40} = \$4.74$

50. $\$\frac{18}{175} = \$0.068\frac{100}{175}$

51. $26\frac{1}{15}$s$= £1.$ 6s. $0\frac{12}{15}$d.

52. - - - $\frac{1}{6}$ bbl.

53. - - - $\frac{1}{12}$ yd.

54. - - - $2\frac{3}{4}$ yds.

55. - - $3\frac{8}{10}$ gals.

56. - - - $5\frac{12}{24}$ qts.

57. - - $7\frac{6}{11}$ bbls.

58. $\$25\frac{2}{24} = \$25.083\frac{8}{24}$

59. $5. $\$15\frac{18}{24} = \$15.75$

60. $£15\frac{115}{300} = £15$ 7s. 8d.

In this example, say £17 15s. $= £17\frac{15}{20} = £\frac{355}{20}$; then $\frac{13}{15}$ multiplied by $\frac{355}{20} = £15\frac{115}{300}$.——Or first multiply $\frac{13}{15}$ by 17, which makes $£14\frac{11}{15} = £14$ 14s. 8d. If he can pay $\frac{13}{15}$ of a pound on a pound, he can pay $\frac{13}{15}$ of the whole debt, but we have already taken $\frac{13}{15}$ of £17, we have now to take $\frac{13}{15}$ of 15s. which is 13s.; this added to £14 14s. 8d. makes £15 7s. 8d. as before.

61. $\frac{17}{20}$£; consequently he can pay $\frac{17}{20}$ of the whole debt, or, $\frac{17}{20}$ of a shilling on a shilling. Ans. £125. 10s. $10\frac{16}{20}$d.

62. - - - $\frac{7}{27}$. 74. - - $4\frac{4}{5}$ times.

63. - - - $\frac{4}{125}$. 75. - - - $5\frac{34}{153}$.

64. - - - $\frac{4}{121}$. 76. - - $14\frac{33}{357}$.

65. - - - $\frac{2}{101}$. 77. - - - $\frac{3}{16}$.

66. - - - $\frac{53}{2175}$. 78. - - - $\frac{4}{103}$.

67. - - - $\frac{53}{2175}$. 79. - - - $\frac{47}{1054}$.

68. - - - $16\frac{18}{880}$. 80. - - - $\frac{73}{15376}$.

69. - - - $1\frac{18}{880}$. 81. - - - $\frac{23}{24}$.

70. - - - $2\frac{959}{42175}$. 82. - - - $\frac{119}{152}$.

71. - - - $21\frac{06}{133}$. 83. - - - $\frac{287}{12360}$.

72. - - - $3329\frac{52}{55}$. 84. - - - $\frac{898}{23475}$.

73. - - $28851\frac{268}{3600}$.

XVIII.

1. $\$\frac{1}{2}$ $1

Be careful to make the learner perform these examples by dividing the denominator

2. $\$\frac{1}{3}$. $\$\frac{1}{2}$. $1

3. $\frac{5}{4} = 1\frac{1}{4}$ bu. $\frac{5}{2} = 2\frac{1}{2}$ bu. 5 bu.

4. $\frac{4}{3} = 1\frac{1}{3}$ bu. 4 bu.

5. $\frac{1}{6}$ of it. $\frac{1}{4}$. $\frac{1}{3}$. $\frac{1}{2}$. The whole

6. $\frac{3}{20}$ bbl. $\frac{3}{8}$ bbl. $\frac{3}{8}$ bbl. $\frac{3}{2}$ bbl. 3 bbl.

7. $8\frac{3}{2} = 9\frac{1}{2}$ bu. 19 bu.

8. $35\frac{3}{4}$ bbls.

9. $\frac{43}{124}$ ton. $\frac{43}{31} = 1\frac{12}{31}$ ton

10. $8\frac{19}{3} = 14\frac{1}{3}$ yds. 43 yards

11. $\$32\frac{7}{10} = \$32.70$. $\$81\frac{3}{4} = \$81.75$

12. - - - $\frac{4}{5}$ 14. - - $\frac{73}{8} = 14\frac{3}{8}$

13. - - - $7\frac{1}{8}$ 15. - - - $1\frac{19}{27}$.

16. - - - $1\frac{106}{109}$
17. - - - $1\frac{146}{171}$
18. - - - $48\frac{7}{10}$
19. - - - $1217\frac{1}{2}$
20. - - - $411\frac{19}{170}$
21. - - - 7
22. - - - 4
23. - - - 15
24. - - - 11
25. - - - 38
26. - - - 327
27. - - - 1114
28. - - - 14186
29. - - - 12069
30. - - - 14095

C XIX.

1. - - 95 yds.
2. - $16\frac{7}{8} = $16.875
3. - - $88\frac{9}{10}$ bu.
4. - - $5\frac{1}{4}$ bu.
5. - - - $2\frac{1}{6}$ yds.
6. - - $18\frac{5}{12}$ lb.
7. - $\frac{1}{4}$ of the apple
8. $24\frac{7}{8} = $24.875
9. - - $22\frac{1}{10}$ cwt.
10. - - $15\frac{5}{8}$ yds.
11. - - $45\frac{2}{21}$ bu.

12. $14\frac{4}{15}$ cwt. = 14 cwt. 1 qr. $1\frac{13}{15}$ lb.
13. $1\frac{6}{35}$ tons = 1 T. 3 cwt. 1 qr. 20 lb.

14. - $\frac{9}{40}$ above water
15. - - - $6\frac{2}{5}$ cwt.
16. - - $23\frac{5}{6}$ gals.
17. - - $41\frac{1}{60}$ cwt.
18. - - $38\frac{12}{119}$ cwt.
19. - $13\frac{47}{77}$ years old
20. - $28\frac{101}{111}$ years old
21. - - $5\frac{37}{85}$ years
22. - - - $\frac{54}{91}$
23. - - - $1\frac{117}{140}$
24. - - - $\frac{896}{221}$
25. - - - $30\frac{6}{13}$
26. - - - $407\frac{3}{7}$
27. - - - $\frac{4}{15}$
28. - - - $\frac{4}{21}$
29. - - - $4\frac{8}{11}$
30. - - - $38\frac{29}{35}$
31. - - - $14\frac{432}{477}$
32. - - $528\frac{167}{187}\frac{28}{81}$

XX.

1.	-	-	-	$23	16.	-	-	-	$12\frac{1}{5}$
2.	-	-	-	$5.29	17.	-	-	-	$27\frac{1}{11}$
3.	-	-	-	$7.37	18.	-	-	-	$49\frac{1}{25}$
4.	$406\frac{4}{21} =			$406.19\frac{1}{21}$	19.	-	-		$601\frac{1}{63}$
5.	$1\frac{50}{63} =			$1.79\frac{41}{63}$	20.	-	-	-	$176\frac{31}{112}$
6.	$28\frac{7}{30} =			$28.23\frac{10}{30}$	21.	-	-	-	$146\frac{1}{10}$
7.			-	$44\frac{3}{14}$ lb.	22.	-	-	-	$129\frac{37}{50}$
8	-	-		$76\frac{59}{63}$ hhds.	23.	-	-	-	$4\frac{73}{400}$
9.	-	-		$14\frac{1543}{4800}$ bbls.	24.	-		$1\frac{964}{1000} =	$1\frac{241}{250}$
10.	-	-		$27\frac{28}{45}$ tons	25.	-	-	-	$403\frac{3}{25}$
11.	-	-		$4.01\frac{111}{164}$	26.	-	-		$86\frac{8113}{4700}$
12.	-	-	-	28	27.	$9\frac{246406}{300000} =			$9\frac{12323203}{15300000}$
13.	-	-	-	28	28.	- $12\frac{183387}{360000} =			$12\frac{20443}{40000}$
14.	-	-	-	24	29.	-	-		$1866\frac{353}{420}$
15.	-	-	-	42	30.	-	-		$31\frac{21401}{80000}$

XXI.

1. The divisors
of 15 are 3, 5*
‘ 18 ‘ 2, 3, 6, 9
‘ 20 ‘ 2, 4, 5, 10
‘ 21 ‘ 3, 7
‘ 24 ‘ 2, 3, 4, 6, 8, 12
‘ 28 ‘ 2, 4, 7, 14
‘ 42 ‘ 2, 3, 6, 7, 14, 21
‘ 48 ‘ 2, 3, 4, 6, 8, 12, 16, 24
‘ 64 ‘ 2, 4, 8, 16, 32
‘ 72 ‘ 2, 3, 4, 6, 8, 9, 12, 18, 24, 36
‘ 88 ‘ 2, 4, 8, 11, 22, 44
‘ 98 ‘ 2, 7, 14, 49

* Every number is divisible by itself.

2. The divisors
of 108 are 2, 3, 4, 6, 9, 12, 18, 27, 36, 54
' 112 ' 2, 4, 7, 8, 14, 16, 28, 56
' 114 ' 2, 3, 6, 19, 38, 57
' 120 ' 2, 3, 4, 5, 6, 8, 10, 12, 15, 20, 24, 30, 40, 60
' 387 ' 3, 9, 43, 129
' 432 ' 2, 3, 4, 6, 8, 9, 12, 16, 18, 24, 27, 36, 48, 54, 72, 108, 144, 216
' 846 ' 2, 3, 6, 9, 18, 47, 94, 141, 282, 423
' 936 ' 2, 3, 4, 6, 8, 9, 12, 13, 18, 24, 26, 36, 39, 52, 72, 78, 104, 117, 156, 234, 312, 468

3. The divisors
of 8000 are 2, 4, 5, 8, 10, 16, 20, 25, 32, 40, 50, 64, 80, 100, 125, 160, 200, 250, 320, 400, 500, 1000, 1600, 2000, 4000
' 4053 ' 3, 1351
' 1864 ' 2, 4, 8, 233, 466, 932
' 2480 ' 2, 4, 5, 8, 10, 16, 20, 40, 62, 124, 155, 248 310, 496, 620, 1240
' 24,876 ' 2, 3, 4, 6, 9, 12, 18, 36, 691, 1382, 2073, 2764, 4149, 6219, 8292, 12438
' 103,284 ' 2, 3, 4, 6, 9, 12, 18, 36, 2869, 5738, 8607, 11476, 17214, 25821, 34428, 51642
' 7,328,472 ' 2, 3, 4, 6, 8, 12, 24, 305353, 610706, 916059 1221412, 1832118, 2442824, 3664236

4.	-	-	2, 4, 8	12.	-	-	-	3, 9
5.		-	-	2, 4	13.	-	-	-	$-\frac{1}{3}$
6.	-	-	-	2, 3, 6	14.	-	-	-	$\frac{4}{25}$
7.	-	-	-	7	15.	-	-	-	$\frac{5}{7}$
8.	-	-	-	2, 4, 8	16.	-	-	-	$\frac{1}{5}$
9.	-	-	-	- 3	17.	-	-	-	$\frac{1}{20}$
10.	-	-	-	2, 4, 8	18.	-	-	-	$\frac{1582}{12911}$
11.	-	-	2, 3, 6, 18		19.	-	-	-	$\frac{7}{105}$

XXII.

1.	-	-	-	$\frac{9}{12}$, $\frac{4}{12}$	13.	-	-	- 1440
2.	-	-	-	$\frac{27}{36}$, $\frac{8}{36}$	14.	-	-	- 10,500
3.	-	-	-	$\frac{20}{24}$, $\frac{9}{24}$	15.	-	-	- 13,500
4.	-	-	-	$\frac{21}{28}$, $\frac{10}{28}$	16.	-	-	$\frac{21}{224}$, $\frac{40}{224}$
5.	-	-	-	$\frac{15}{36}$, $\frac{14}{36}$	17.	-	-	- $\frac{8}{54}$, $\frac{7}{54}$
6.	-	-	-	24	18.	-	-	$\frac{75}{270}$, $\frac{80}{270}$, $\frac{51}{270}$
7.	-	-	-	56	19.			$\frac{96}{216}$, $\frac{135}{216}$, $\frac{126}{216}$, $\frac{64}{216}$
8.	-	-	-	45	20.	-	.	$\frac{156}{975}$, $\frac{45}{975}$, $\frac{130}{975}$
9.	-	-	-	90	21.	-		$\frac{2106}{46008}$, $\frac{3337}{46008}$
10.	-	-	-	210	22.	-	-	$\frac{280}{28000}$, $\frac{43}{28000}$
11.	-	-	-	840	23.	-	-	$\frac{276}{3000}$, $\frac{175}{3000}$
12.	-	-	-	1680	24.	-	-	$\frac{435}{72000}$, $\frac{57}{72000}$

XXIII.

1.	-	15 bu. ; $7\frac{1}{2}$ bu.	10.	-	-	$871\frac{1}{8}$ axes
2.		30 peaches; 15 do.	11.	-	-	12 acres
3.		24 labourers; 8 do.	12.	-	-	$19\frac{1}{5}$ acres
4.	-	- 24 acres	13.	-	-	$12\frac{1}{2}$ bu.
5.	-	- $67\frac{1}{7}$ boxes	14.	-	-	$11\frac{1}{5}$ bbls.
6.	-	- $236\frac{1}{4}$ bottles	15.	-	-	$4\frac{37}{47}$ acres
7.	-	- $46\frac{2}{3}$ weeks	16.	-	-	- $1\frac{5}{7}$ tons
8.		80 days ; 160 persons	17.	-	-	$443\frac{3}{79}$ lb.
9.	-	- $184\frac{3}{13}$ days	18.	-	-	$62\frac{24}{33}$ days

19. $57\frac{4}{5}$ coats

20. $7\frac{9}{11}$ rods = 7 rods, $4\frac{1}{2}$ yds.

21. $15\frac{9}{11}$ rods = 15 rods, $4\frac{1}{2}$ yds.

22. $51\frac{2}{3}\frac{2}{3}$ rods = 51 rods, 3 yds. 2 ft. 6 in.

23. $3\frac{4}{6}\frac{2}{6}\frac{3}{6}$ fur. = 3 fur. 29 rods, 4 yds. 2 ft. 6 in.

24. $8\frac{51}{165} = 8\frac{17}{55}$ miles = 8 miles, 2 fur. 18 rods, 5 yds.

25. - - - 3 bu.
26. - 4 dozen; 7 do.
27. - 2 dozen; $6\frac{1}{3}$ do.
28. - $2\frac{1}{3}$ bu. $14\frac{1}{3}$ bu.
29. - - 4 lb. 9 lb.
30. - - - $4\frac{1}{2}$ bu.
31. - - $2\frac{1}{4}$ weeks
32. - - 6 lb. 12 lb.
33. - $6\frac{2}{5}$ bu. $2\frac{2}{15}$ bu.
34. - $5\frac{3}{5}$ bu. $2\frac{4}{5}$ bu.
35. - - $\frac{1}{3}$ bu. $\frac{2}{3}$ bu.
36. - - $\frac{2}{5}$ bu. $\frac{4}{5}$ bu.
37. - 54 eggs
38. - $11\frac{1}{4}$ penny loaves
39. $2\frac{13}{16}$ four-penny loaves
40. $11\frac{1}{4}$ two-penny loaves. $58\frac{1}{8}$ do.
41. $2\frac{4}{5}$ six-penny loaves. 14 do.
42. - - $7\frac{1}{10}$ hats
43. - - $7\frac{1}{10}$ hats
44. - - $9\frac{15}{20}$ bu.
45. - - $9\frac{15}{20}$ bu.
46. - - $25\frac{1}{14}$ coats
47. - - $7\frac{11}{25}$ weeks
48. - - $19\frac{208}{279}$ suits
49. - $19\frac{8467}{13887}$ days
50. - - $44\frac{137}{390}$ cows
51 - $3\frac{3165}{3664}$ chaldrons
52. - - $17\frac{4687}{18853}$ cwt.
53. - $15\frac{2024}{4917}$ casks
54. $30\frac{17535}{19128} = 30\frac{5845}{6376}$ tons
55. - - $91\frac{4}{5}$ times
56. - - $370\frac{4}{13}$ times
57. - - $13\frac{36}{1885}$ times
58. - $39\frac{2198}{4819}$ times
59. - - $16\frac{24}{35}$ times
60. - - $139\frac{7}{12}$ times
61. - - $6\frac{611}{117}$ times
62. - - $6\frac{3964}{4921}$ times
63. - - - $59\frac{14447}{41112}$
64. - - - $\frac{1}{24}$ bbl.
65. - $\frac{1}{21}$ bbl. $\frac{2}{21}$ do.
66. $\frac{1}{59}$ cwt. $\frac{3}{59}$ do. $\frac{17}{59}$ do.
67. - - $\frac{230}{841}$ ton

68 $\frac{7}{8} = \frac{35}{40}$, and $\frac{2}{5} = \frac{16}{40}$. Ans. $\frac{16}{35}$ of a bushel

69. $2\frac{3}{5} = \frac{13}{5} = \frac{91}{35}$, and $3\frac{7}{7} = \frac{23}{7} = \frac{115}{35}$

These being reduced to a common denominator have the same relation as their numerators; therefore take the numerators and proceed with them as if they were whole numbers. See Art. XVI. example 158, and the following. $115 + 91 = 206$. One paid $\frac{115}{206}$ and the other $\frac{91}{206}$ of the whole, and they should have the same proportions. Ans. $\frac{91}{206}$ and $\frac{115}{206}$ respectively.

70. $5\frac{1}{2} = \frac{11}{2} = \frac{33}{6}$, and $7\frac{3}{3} = \frac{23}{3} = \frac{46}{6}$. $33 + 46 = 79$

The first should pay $\frac{33}{79}$, and the second $\frac{46}{79}$ of 21 dolls. Ans.

$8\frac{4}{11} = 8.\ 8.77\frac{7}{11}$, and $12\frac{11}{18} = 12.22\frac{2}{18}$ respectively.

71. - - - $\frac{136}{325}$
72. - - - $\frac{287}{1119}$
73. - - - $\frac{8894}{9853}$
74. - - $\frac{44}{1868991}$
75. - - - $\frac{8}{21}$
76. - - - $\frac{141}{1225}$
77. - - - $\frac{1873}{2676}$
78. - - $\frac{1441907}{2033864}$
79. - - $\frac{74}{1618612}$

XXIV.

1. - - - $1.50
2. - - $26.75
3. - - - $8.625
4. - - - $108
5. - - $192.80
6. - - $99.44
7. - - $127005
8. - - $233334
9. - - $474679.66
10. - - $215665.58
11. - - - $\frac{2}{3}$ doll.
12. - - - $\frac{3}{4}$ doll.
13. - - - $1\frac{3}{7}$
14. - - - $2\frac{3}{5}$
15. - - - $6\frac{1}{3}\frac{2}{3}$
16. - - - $98\frac{1}{8}$
17. - - $113\frac{9}{17}$
18. - - $198760\frac{336}{405}$
19. - - - $0.40
20. - - 8 cents
21. - - $2. $8
22. - $0.30. $2.40
23. - $0.19. $1.52
24. - - $2. $10
25. - $0.60. $4.20
26. - - . $20
27. - - 40 miles
28. - - - $6.79
29. 24 years is $\frac{3}{8}$ of his age.
Ans. 64 years
30. - - $91.26
31. - $7\frac{1}{2} = $7.50
32. - $5\frac{2}{3}$ cents. $0.45\frac{1}{3}$
33. - - $2\frac{4}{5}$ cents

34. $1\frac{1}{4} = 1.25$. $16\frac{1}{4} = 16.25$
35. $6\frac{2}{3}$ miles.
36. $74666\frac{2}{3} = 74666.66\frac{2}{3}$
37. $18750.
38. $305075\frac{2}{4}\frac{5}{6} = 305075.89\frac{1}{4}$
39. $6\frac{1}{2} = 6.60$

40. $2\frac{1}{5} = \frac{13}{5}$. $\frac{1}{13}$ of 13s. is 1s. and $5 \times 1 = 5$. Ans. 5s.
41. $8\frac{9}{13} = \frac{113}{13}$; $\frac{1}{113}$ of 15 is $\frac{15}{113}$, and 13 times this is $\frac{195}{113} = \$1\frac{82}{113}$. $\$86\frac{32}{113} = 86.28\frac{36}{113}$
42. Find the price of 1 cwt., as in the last, and let it stand in the form of an improper fraction; then reduce $17\frac{3}{7}$ to an improper fraction and multiply by it. Ans. $\$198\frac{15}{77}\frac{3}{3} = \$198.19\frac{6}{77}\frac{3}{3}$
43. $\$\frac{2}{27}$. $\$\frac{1}{27}$
44. $\$\frac{2}{45}$. $\$\frac{8}{45}$
45. $\$\frac{40}{63}$
46. $1\frac{59}{136}$ month. $7\frac{23}{136}$ do.
47. $\$10\frac{4}{15}$. $\$178\frac{33}{66} = 178.38\frac{1}{3}$
48. $\$145\frac{7}{20} = 145.35$
49. $\$4\frac{17}{252} = 4.07\frac{5}{9}$
50. $\$5\frac{10117}{33\,55} = 5.30\frac{219}{671}$
51. $1\frac{4377}{13779}$ bbls. $\frac{13779}{18116}$ yds.
52. $£1\frac{89}{220} = 17\text{s. } 2\frac{3}{11}\text{d.}$
53. $£93\frac{27}{36} = £93\ 9\text{s. } 7\frac{5}{7}\text{d.}$
54. He sold $\frac{6}{35}$ of the whole. The vessel was worth $49000
55. $£2653\frac{3}{49} = £2653\ 1\text{s. } 2\frac{34}{49}\text{d.}$
56. $9\frac{173}{285}$ days
57. $7\frac{7}{24}$ days
58. $52\frac{104}{243}$ acres
59. There is $\frac{4}{35}$ of it in the mud; and in the mud and water both there is $\frac{14}{35}$ of it; therefore $7\frac{3}{5}$ is $\frac{21}{35}$ of the whole pole. Ans. $12\frac{7}{24}$ ft. = 12 ft. $3\frac{1}{2}$ inches.

60.	-	-	-	$160	67.	-	-	-	$24\frac{3}{53}$
61.	-	-	-	$120	68.	-	-	-	$52\frac{16}{29}$
62.	-		-	72	69.	-	-		$5162\frac{10}{13}$
63.	-	-	-	864	70.	-	-	-	$3681\frac{37}{76}$
64.	-	-	-	$95\frac{1}{3}$	71.	-	-	-	$254\frac{33}{123}$
65.	-	-	-	$173\frac{1}{13}$	72.	-	-		$22162\frac{91}{387}$
66.	-	-	-	$1585\frac{17}{23}$	73				$4134\frac{279}{543}$

74. - - - $4\frac{1}{3}$
75. - - - $\frac{14}{37}$
76. - - - $1\frac{11}{21}$
77. - - - $\frac{15}{36}$
78. - - - $1\frac{8}{133}$
79. - - - $1\frac{271}{288}$
80. - - $2\frac{1564}{1218} = 2\frac{11}{87}$
81. - $\frac{1474}{3468} = \frac{737}{1734}$
82. - $1\frac{189}{6519} = 1\frac{21}{731}$
83. - - $55\frac{814}{3028}$
84. - $7\frac{112}{218} = 7\frac{14}{27}$
85. - - $173\frac{158}{209}$
86. - - $216\frac{376}{387}$
87. - $241\frac{68}{108} = 241\frac{17}{27}$
88. $137\frac{6568}{4617} = 137\frac{886}{1539}$
89. $2\frac{2164}{5135} = 2\frac{7388}{17175}$
90. $2\frac{2184}{5135} = 2\frac{7388}{17175}$
91. - - $33\frac{2468}{4930}$
92. - - $33\frac{2468}{4859}$
93. - $19\frac{93}{120} = 19\frac{31}{40}$
94. - - - $19\frac{31}{40}$
95. - - $104\frac{116}{143}$
96. - - $104\frac{116}{143}$
97. - - - $67\frac{1}{5}$
98. - - , $67\frac{1}{5}$ times
99. - - - $67\frac{1}{5}$
100. - - - $4\frac{43}{75}$
101. - - $4\frac{43}{75}$ times
102. - - - $4\frac{43}{75}$
103. - - - $5\frac{69}{80}$
104. - - $5\frac{69}{80}$ times
105. - - - $5\frac{69}{80}$

106. Cost \$210, gained \$42
107. First cost \$216. Gain \$27
108. Cost $\$2884\frac{1}{2} = 2884.50$. Gain \$961.50
109. $\$1.50\frac{301}{704}$ per gall.
110. Cost $266\frac{12}{13} = 266.92\frac{4}{13}$. Gain $\$80.07\frac{9}{13}$
111. Cost $\$120\frac{3}{11} = 120.27\frac{3}{11}$. Gain $\$26.72\frac{8}{11}$
112. Gain $\$2064\frac{1}{25} = 2064.04\frac{6}{11}$
113. Cost $\$249\frac{1}{3} = 249.33\frac{1}{3}$. Loss $\$62.33\frac{1}{3}$
114. Cost $\$294\frac{6}{7} = 294.85\frac{6}{7}$. Loss $\$36.85\frac{6}{7}$
115. Loss $\$344\frac{8}{11} = 344.72\frac{8}{11}$
116. Whole loss $\$16.80\frac{3}{4}$. Loss per gall. $\$0.08\frac{25}{28}$
117. Loss per yd. $\$0.87\frac{101}{403}$
118. Cost $\$150\frac{1}{2} = 150.50$
119. Cost $\$248\frac{2}{11} = 248.18\frac{2}{11}$
120. He gained $\frac{13}{100}$ of the cost, consequently he sold them for $\frac{113}{100}$ of the cost. Divide by 113, and the quotient will be $\frac{1}{100}$ of the cost. Or, which is generally better, multiply first by 100, and divide by 113, and you will

obtain the cost. Cost $\$119\frac{63}{113} = 119.46\frac{102}{113}$. Gained $\$15.53\frac{11}{113}$

121. Gained $\$1526\frac{17}{33} = \$1526.51\frac{17}{33}$

122. Cost $\$1117\frac{1}{22} = 1117.04\frac{6}{11}$. Loss $\$134.04\frac{6}{11}$

123. Cost $\$331.16$. Loss $\$82.79$

124. Cost $669\frac{3}{13} = 669.23\frac{1}{13}$. Sold them for $\$756.23\frac{1}{13}$

125. Cost $\$215$

126. Cost $\$595\frac{15}{23} = 595.65\frac{5}{23}$. Sold them for $\$458.65\frac{5}{23}$

127. 40d. = 3s. 4d. per lb.

128. $\$0.51\frac{1}{3}$ per gall.

Note. D gains 9 cents on a gallon, which is $\frac{9}{51}$ of the cost; hence 20 cents is $\frac{9}{23}$ of the cost of the brandy.

129. Age 66 years

Note. $\frac{1}{2}$ and $\frac{1}{3}$ are $\frac{5}{6}$, which added to his age makes $\frac{11}{6}$. Hence 121 is $\frac{11}{6}$ of his age.

130. $\$216\frac{2}{3} = 216.66\frac{2}{3}$

131. $\$950$

132. $\$223.58\frac{2}{3}$

133. $\$441.66\frac{2}{3}$

134. $\$1077.77\frac{7}{9}$

135. $\$358.18\frac{2}{11}$

136. $£171\frac{3}{107} = £171\ 0s.\ 6\frac{78}{107}d.$

137. $\$114\frac{1}{6} = \$114.16\frac{2}{3}$

138. $\$270\frac{40}{99} = 270.75\frac{25}{33}$

139. $\$822\frac{34}{103} = 822.33\frac{1}{103}$

140. $\$96\frac{2}{13} = 96.15\frac{5}{13}$

141. $\$0.32\frac{51}{253}$

142. $\$23.22\frac{8}{31}$

Miscellaneous Examples, page 79.

1. 2 sq. in.; 3 do.; 4 do.; 5 do. 7 do.

2. 8 sq. in.; 16 do.; 24 do. 32 do.; 40 do.; 64 do.
3. 2 sq. ft.; 3 do.; 5 do.; 9 do.; 15. do.
4. 9 sq. ft.; 18 do.; 27 do.; 45 do.; 63 do.; 81 do.
5. 13 sq. in.; 26 do.; 39 do.; 104 do.
6. 16 sq. ft.; 32 do.; 48 do.; 80 do.; 128 do.; 208 do
7. Multiply the length by the breadth
8. 234 sq. ft.
9. 13,871 sq. ft.
10. 196 sq. rods
11. 160 sq. rods
12. $9\frac{7}{17}$ rods wide
13. 144 sq. in.
14. 18 in. in length
15. 9 sq. ft.
16. $30\frac{1}{4}$ sq. yds.
17. 1296 sq. in.
18. 40 sq. rods
19. 4 roods
20. See Arithmetic, page 239
21. 39,204 sq. in.
22. 4840 sq. yds.
23. 6,272,640 sq. in.
24. 12 sq. ft.
25. 1 acre, 126 rods, or $1\frac{63}{80}$ acre
26. $32\frac{\text{ABBBBBB}}{6272640}$ acres = 32 acres, 14 rods, 8 yds. 1 ft. 28 in.
27. 102,400 sq. rods
28. 640 acres
29. 126,720,000,000 acres
30. 1980 sq. in.; 13 sq. ft. 108 in., or $13\frac{1}{4}$ sq. ft.
31. $110\frac{14}{17}\frac{1}{8}$ acres
32. $49\frac{41}{243}$ yds.
33. 2 cub. in.; 3 do.; &c. 8 do.
34. 12 cub. in.; 24 do.; &c. 96 do.

35. 4 cub. in.; 8 do.
36. 12 cub. in; 24 do.; 36 do.
37. 80 cub. in.; 160 do.; 240 do; 400 do; 560 do.
38. 234 cub. in.; 1170 do.; 2574 do.
39. Multiply together the length, breadth, and thickness
40. 1728 cub. in.
41. 128 cub. ft.
42. See Arithmetic, page 239
43. 221,184 cub. in.
44. 86,400 cub. in.
45. $271\frac{43}{864}$ cub. ft.
46. $23\frac{19}{36}$ cub. ft.

Note. When one dimension is given in feet and the other two in inches, multiply the numbers together without reducing the feet to inches, and divide the product by 144, and the quotient will be the answer in cubic feet. If two dimensions are in feet and one in inches, multiply them together as they are, and divide the product by 12 to reduce it to feet. In the above example, if 28 feet be reduced to inches, the operation will stand thus

$$\frac{11 \times 11 \times 28 \times 12}{1728} = \frac{11 \times 11 \times 28 \times 12}{144 \times 12}$$

rejecting the 12 from the numerator and denominator, it becomes

$$\frac{11 \times 11 \times 28}{144}$$

47. $57\frac{7}{24}$ ft. = 1 ton $7\frac{7}{24}$ ft.
48. 8 ft.
49. 345 cub. ft. $21\frac{9}{16}$ feet of wood. 2 cords $5\frac{9}{16}$ feet

XXV.

Decimal Fractions.

1.	27.6	28.	1.043
2.	14.07	29.	17.0573
3.	123.008	30.	193.0047
4.	108.5	31.	87.00106
5.	73.09	32.	95.406
6.	4.006	33.	98.006004
7.	16.001	34.	.30507
8.	.6	35.	.0807
9.	.05	36.	$42\frac{5}{10} = 42\frac{1}{2}$
10.	.007	37.	$84\frac{25}{100} = 84\frac{1}{4}$
11.	.0002	38.	$9\frac{8}{10} = 9\frac{4}{5}$
12.	3.42	39.	$137\frac{4}{25}$
13.	$\frac{40}{100}$ or .40	40.	$25\frac{1}{8}$
14.	$\frac{42}{100}$ or .42	41.	$18\frac{5}{8}$
15.	$\frac{300}{1000}$ or .300	42.	$11\frac{321}{1000}$
16.	$\frac{80}{1000}$ or .080	43.	$163\frac{5629}{6258}$
17.	$\frac{385}{1000}$ or .385	44.	$72\frac{13}{2000}$
18.	7.385	45.	$4\frac{1}{4000}$
19.	$\frac{2000}{10000}$ or .2000	46.	$13\frac{30029}{80000000}$
20.	$\frac{500}{10000}$ or .0500	47.	$\frac{3}{4}$
21.	$\frac{60}{10000}$ or .0060	48.	$\frac{5}{16}$
22.	$\frac{2567}{10000}$ or .2567	49.	$\frac{3}{40}$
23.	.2567	50.	$\frac{4}{3125}$
24.	13.23	51.	$\frac{3}{20000}$
25.	21.182	52.	$\frac{63}{800000}$
26.	12.5736	53.	$\frac{3001137}{20000000}$
27.	142.38746		

XXVI.

1. $22.295
2. $13.409 = 13\frac{409}{1000}$ bu.
3. $75.975 = 75\frac{39}{40}$ cwt.
4. $759.77625 = 759\frac{621}{800}$ bu.
5. £16.365 = £16\frac{73}{200}$
6. $8899.3799 = 8899\frac{3799}{10000}$
7. $24.015 = 24\frac{3}{200}$ yds.
8. $65.625
9. £155.245 = £155\frac{49}{200}$
10. £2.428 = 2\frac{107}{250} = £2 8s. 6\frac{2}{25}$d.
11. £95.775 = £95\frac{31}{40}$
12. $333.75
13. $468.8312 = 468\frac{1039}{1250}$ lb.
14. $9.1372 = 9\frac{343}{2500}$ tons

XXVII.

Multiplication of Decimals.

1.	- -	$87.15	12.	-	-	-	.0342
2.	- -	$63.00	13.	-	-	-	$3
3.	- -	61.18 bu.	14.	-	-	-	$63
4.	- -	194.8 cwt.	15.	-	-	-	$36
5.	74.375 =	74\frac{3}{4}$ cwt.	16.	-	-	-	$58
6.	- -	325.5 cwt.	17.	-	-	-	$190
7.	- -	1619.56	18.	-	-		$351.50
8.	- -	2338.911	19.	-	-	-	$456
9.	- -	808.868	20.	-	-		$4283.40
10.	- -	38.7555	21.	-	-		$199.50
11.	- -	12.528	22.	-	-		$112.50

23.	-	-	64	45.	-	-	$197.10
24.	-	-	214	46.	-	-	$474.00625
25.	-	-	107	47.	-	-	$1938.90
26.	-	-	713.769	48.	-	-	$0.018
27.	-	-	713.769	49.	-	-	1.9665 cwt.
28.	-	-	15071	50.	-	-	10.35
29.	-	-	243.6	51.	-	-	18.802
30.	-	-	6058	52.	-	-	34.6
31.	-	-	41711.9491	53.	-	-	290.1186
32.	-	-	67418	54.	-	-	25.2885
33.	-	-	3393	55.	-	-	13.167392
34.	-	-	627120	56.	-	-	7.003215
35.	-	-	49552.25	57.	-	-	3.410904106
36.	-	-	667683.84	58.	-	-	.002012
37.	-	-	$0.06	59.	-	-	.00030021
38.	-	-	.06	60.	-	-	.06
39.	-	-	.06	61.	-	-	.008
40.	-	-	$0.36	62.	-	-	.00003
41.	-	-	$0.70	63.	-	-	.00001
42.	-	-	$1.62	64.	-	-	.000011021
43.	-	-	$2.021	65.	-	-	1.344200769712
44.	-	-	$39.738				

Miscellaneous Examples, page 87.

1.	-	-	$69	6.	-	-	$77.832—
2.	-	-	$946.875	7.	-	-	$360.934+
3.	-	-	$62.3656+	8.	-	-	$401.899+
4.	-	-	$57.145+	9.	-		$655.717+
5.	-	-	$39.918+	10.	-	-	$481.384+

11. 3.696+cwt. 17.351+cwt. 4.1445+cwt.
12. 43.2777+hhds. 0.24+hhds. 7.01389—hhds.
13. $3.816+

In the following examples, the nearest decimal will be given without the mark to show whether it is too large or too small.

14.	-	-	$2.137	29.	-	-	.7879 rod
15.	-	-	$2.391	30.	-	-	.1667 ft.
16.	-	-	$17.973	31.	-	-	.5833 ft.
17.	-	-	$129.594	32.	-	-	.4444 rod
18.	-	-	$4.414	33.	-	-	.02434 mile
19.	-	-	.875 yd.	34.	-	-	£0.675
20.	-	-	.4375 yd.	35.	-	-	.4375s.
21.	-	-	.8125 lb.	36.	-	-	£0.574
22.	-	-	.6071 qr.	37.	-	-	See book.
23.	-	-	.475 qr.	38.	-		£7 14s. 11½d.
24.	-	-	.25 day	39.	-		£40 3s. 4d.
25.	-	-	.684 day	40.	-	-	£28 4s. 8½d.
26.	-	-	.5709 day	41.	-		£120 10s. 9½d.
27.	-	-	.7833 h.	42.	-	-	See book.
28.	-	-	.6464 h.				

43. $5\frac{3}{7} = 5.4$. 4 cwt. 3 qrs. 7 lbs. = 4.8125 cwt.
These multiplied together produce 25.9875 cwt.
Reducing the fraction to quarters, pounds, &c.

.9875
4
qrs. 3.9500
28
760
190
lbs. 26.60
16
oz. 9.6

Ans. 25 cwt. 3 qrs. 26 lb 9⅗ oz.

44. 25.905 cwt. = 25 cwt. 3 qrs. 17 lb. $3\frac{1}{5}$ oz.
45. 7s. 8d. 3 qrs.
46. 19s. 8d.
47. 2 qrs. 9 lb. 4 oz.
48. 25 lb. 12 oz.
49. 2 qrs. 26 lb. 7 oz.
50. 9d.
51. 10 lb. 12 oz.
52. 93.156 lb. = 93 lb. 2 oz.
53. 1124.16d.
54. 8 h. 18 min. 14 sec.
55. 35 min. 15 sec.
56. 3.5 ft.; 4.25 ft.; 7.75 ft.; 3.66 + ft.; 5.58 + ft.; 9.833 + ft.
57. 4 in. 1.5 barley corn.
58. 67.4 sq. in.
59. 1458 in.
60. 11.43 sq. ft.
61. 281.94 sq. ft.
62. 29.72 sq. ft.
63. 30.4 ft.
64. 204 cub. ft.
65. See book.
66. $95.078
67. $89.171
68. Gained $58.122. Whole $445.602.

69.	-	$1331.25	75.	- -	$46.744
70.	- -	$25.966	76.	- -	$169.812
71.	- -	$118.343	77.	- -	$0.60
72.	- -	$384.12	78.	- -	$3.719
73.	- -	$95.452	79.	-	$2.595
74.	- -	$2124.725	80.	- -	$12.85

81. For 2 years, 12 per cent. = .12.
For 3 years, 18 do. = .18.
For 4 years, 24 do. = .24.

82. For 6 months, 3 per cent. = .03
For 2 months, 1 do. = .01
For 4 months, 2 do. = .02
For 1 month, $\frac{1}{2}$ do. = .005
For 3 months, $1\frac{1}{2}$ do. = .015
For 5 months, $2\frac{1}{2}$ do. = .025
For 7 months, $3\frac{1}{2}$ do. = .035
For 8 months, 4 do. = .04
For 9 months, $4\frac{1}{2}$ do. = .045
For 10 months, 5 do. = .05
For 11 months, $5\frac{1}{2}$ do. = .055

83. For 13 months, $6\frac{1}{2}$ per cent. = .065
For 14 months, 7 do. = .07
For 17 months, $8\frac{1}{2}$ do. = .085

84. For 6 days, $\frac{1}{10}$ per cent. = .001
For 12 days, $\frac{2}{10}$ do. = .002
For 18 days, $\frac{3}{10}$ do. = .003
For 24 days, $\frac{4}{10}$ do. = .004
For 36 days, $\frac{6}{10}$ do. = .006
For 42 days, $\frac{7}{10}$ do. = .007
For 48 days, $\frac{8}{10}$ do. = .008
For 54 days, $\frac{9}{10}$ do. = .009

85. $0.472
86. $0.544
87. $4.439
88. $3.515
89. $17.026
90. $4.273
91. $0.703
92. $0.426
93 $0.197
94. $0.832
95. $1.53
96. $20.966

97. 6 months is 3 per cent. = .03. Then 1 month and 15 days are 45 days, which, divided by 6, gives .0075. The rate is .0375. Ans. $4.33.

98. $30.37

99. $13.93

100. $409.43

101. $1085.073
102. Interest $62.91 Due $596.91
103. $15.70
104. See book
105. 15s. = £0.75; 3d. 2 qrs. = 14 farthings; adding 1 because the number is greater than 12, it may be called £0.015. The whole is £13.765. The rate for 1 year and 6 months is .09

13.765
.09

Ans. £1.23885

The .2 = 4s. The rest of the fraction is nearly .039. Taking 2 from this, because the number is greater than 36, we have 37 farthings, which are 9d. 1 qr. Ans. £1 4s. 9¼d.

106. 4s. 4½d.
107. £34 7s. 11d.
108. £4 18s. 4d.
109. £1 5s. 4½d.
110. 2s. 6d. 2qr.
111. 2d.
112. £7 3s. 7¾d.
113. £42 11s. 3½d.

XXVIII.

Division of Decimals.

1.	-	-	$3.75	4.	-	-	1.5 bbl.
2.	-	-	$5.781	5.	-	-	1.406 bu.
3.	-	-	$36.715	6.	-	-	4.899 miles.

7.	- -	£1 8s. 3¼d.	41.	- -	$4.148
8.	- -	£83 11s. 1d.	42.	- -	9s. 1¼d.
9.	- -	6.172	43.	- -	$2.50
10.	- -	34.326	44.	- -	$22.857
11.	- -	.352	45.	37.825s. =	£1 17s.10d.
12.	- -	2.871	46.	379.562s. =	£18 19s. 6¾d
13.	- -	3.4617	47.	- -	13.846 times
14.	- -	28.903	48.	- -	12 times
15.	- -	1.4038	49.	- -	37.895
16.	- -	4618	50.	- -	297.771
17.	- -	.09226	51.	- -	2.567
18.	- -	.02634	52.	- -	10.204
19.	- -	.00413	53.	- -	3.627
20.	- -	.0258	54.	- -	10
21.	- -	.03077	55.	- -	100
22.	- -	.00128	56.	- -	61.538
23.	- -	.00007	57.	- -	44.156
24.	- -	.0005765	58.	- -	687.1345
25.	- -	.0001006	59.	- -	530000
26.	- -	27 galls.	60.	- -	254000
27.	- -	70.6 bu.	61.	- -	10
28.	-	Omitted in Book	62.	- -	100
29.	- -	18.18 lb.	63.	- -	61.538
30.	- -	166.7 lemons	64.	- -	44.156
31.	- -	21.7 coats	65.	- -	687.1345
32.	- -	17.7 acres	66.	- -	530000
33.	- -	10.56 acres	67.	- -	254000
34.	- -	15.41 hours	68.	- -	19142.857
35.	- -	43.333 days	69.	- -	19142.857
36.	- -	38.87 days	70.	- -	35.862
37.	- -	43.69 galls.	71.	- -	2.802
38.	- -	$2.80	72.	- -	16.6113
39.	- -	$6.667	73.	- -	.8333
40.	- -	$8.364	74.	- -	.8333

75.	.517	109.		9.821 lb.
76.	.517	110.		$6.30
77.	.46	111.	£6.484 =	£6 9s. $8\frac{1}{4}$d.
78.	.46	112.		17.918 bu.
79.	.1905	113.		6s. $8\frac{3}{4}$d.
80.	.1905	114.		£1 2s. 4d.
81.	20	115.		£29 1s. $2\frac{1}{2}$d.
82.	156.627	116.		6.583
83.	6320.896	116.		42.173
84.	124.031	117.		352.46
85.	408.163	118.		754.26
86.	177.211	119.		1.28255
87.	15700000	120.		783.57
88.	20.473 galls.	121.		14.6934
89.	2.43 galls.	122.		.9957
90.	5.324 galls.	123.		28.308
91.	14.942 bbls.	124.		28.308
92.	$6.765	125.		99.314
93.	£0.781 = 15s. $7\frac{1}{2}$d.	126.		99.314
94.	$6.355	127.		.10837
95.	$96.72	128.		.003002
96.	3.105 times	129.		$\frac{1757}{1423}$
97.	322.718	130.		$\frac{3756}{8873}$
98.	17.549	131.		$\frac{6375}{5268} = \frac{2125}{1756}$
99.	22.321	132.		$\frac{3450}{3756} = \frac{1725}{1878}$
100.	22.321	133.		$\frac{16487}{23500}$
101.	100	134.		$\frac{11345\,00}{214764} = \frac{283635}{53691}$
102.	100	135.		$\frac{7384}{3700} = \frac{1846}{925}$
103.	5	136.		$\frac{7}{500}$
104.	5	137.		$6\frac{47387}{4200}$
105.	1	138.		$5\frac{3000}{67}$
106.	1	139.		$\frac{300}{1}$
107.	13.27	140.		$\frac{35}{78}$
108.	3.598	141.		$\frac{1375}{1750} = \frac{688}{875}$

142. - - $\frac{703\,84}{429\,500}$ 148. - - $\frac{1\,806\,400}{9\,944\,785}$

Miscellaneous Examples, page 101.

1. $70.269
2. $122.784
3. $8.192
4. $206.328
5. 1.417 cwt.
6. £43 11s. 1½d.
7. 38.727 oz. = $38\frac{8}{11}$ oz.
8. 10,383 ft.
9. 5.1 yds.
10. .00517 of a guinea = 13d.*
11. 43.976 days
12. 126.727 days
13. 272.875 sq. ft.; 8 sq. ft.; 34.11 yds.
14. 39.48 yds.
15. 3117.56 ft. $10.911
16. 860.2 ft.
17. 10.72556 bunches
18. 7.667 acres
19. $225.075
20. 3 cords
21. 2 ft. 8 in. = 3.666 + ft.

$$\begin{array}{r} 3.666+ \\ \underline{\qquad 4} \\ 14.664+ \\ \underline{\qquad (2} \end{array}$$

Ans. 7.33 ft. of wood.

* In this example, instead of .075 of a guinea, read .75 of a guinea.

In this I multiply the height and breadth together, and then, instead of multiplying by 8 and dividing by 16, I divide at first by 2.

22. 4.3 ft. of wood
23. 9.23 ft. of wood.
24. 1.39 cord, or 1 cord, 3.1 ft.
25. 4.45 ft. = 4 ft. 5.4 in.
26. 70848 bricks
27. £141 12s. 11¼d.
28. $34.59
29. $33.734
30. £95 1s. 0¾d.
31. 6145.88(153647
    6145.88 ———
    ——— $0.04 on a dollar
    .. Ans. $939.027
32. The tax on $1 is $0.0339. Ans. $87.23
33. .2855=28$\frac{5}{100}$ per cent.
34. He gained $\frac{5}{20}$ of the first cost, which is .25 or 25 per cent.
35. .044 = 4$\frac{4}{10}$ per cent.
36. .11 = 11 per cent.
37. 1s. 8d. = 20d. 2s. 3d. = 27d. He gained 7d. which is $\frac{7}{20}$ of the first cost. $\frac{7}{20}$ = .35 or 35 per cent.
38. .137 = 13$\frac{7}{10}$ per cent.
39. 15$\frac{3}{10}$ per cent.
40. 18$\frac{6}{10}$ per cent.
41. He can pay $\frac{13}{19}\frac{47}{137}\frac{119}{143}$ of the whole debt. This reduced to a decimal is .704 — Ans. 70$\frac{4}{10}$ per cent. nearly
42. The whole discount was $11.40, which is $\frac{11.4}{57.0}$ = .2 Ans. 20 per cent.
43. The whole interest was $5.22, which is $\frac{5.22}{87.00}$ of the

principal. This reduced to a decimal is .06. Ans. 6 per cent.

44. He paid $12.81 for 2 years, which is $6.405 for 1 year. $\frac{6}{1}\frac{4}{8}\frac{0}{3}\frac{5}{0}\frac{}{0}\frac{}{0} = .035$. Ans. $3\frac{1}{2}$ per cent.

45. Find how much he paid for 1 year, and then find the rate as above. Ans. $6\frac{1}{2}$ per cent. nearly

46. $.0452 = 4\frac{52}{100}$ per cent.

47. Since 4s. 6d. is equal to 9 sixpences, and £1 is equal to 40 sixpences

$$40(9$$

Ans. $4.444 +

48. Reduce the £35 to sixpences and divide by 9; or multiply $4.444 + by 35. If there are shillings and pence, they must be reduced to decimals. Ans. $155.555

49. £27 14s. 8d. = £27.733 or £27.733

4.444	40
110932	11.09320(9
110932	
110932	$123.258
110932	

$123.245452

The latter method is shorter and more exact.

50. $834.964 +

51. Multiply by 9 to reduce it to English sixpences, and then divide by 40, the number of sixpences in £1; or divide $19.42 by $4.444. Ans. £4.369 = £4 7s. $4\frac{1}{2}$d.

52. £35.325 = £35 6s. 6d.

53. £536 11s. 3d.

54. Cost $680.30 Sold $761.94

55.	-	-	$5.386 +	65.	-	-	$0.00291
56.	-	-	$5.80	66.	-	-	$0.00068
57.	-	-	$12.848	67.	-	-	$0.002177 +
58.	-	-	$6.517	68.	-	-	$0.06372
59.	-	-	$16.387	69.	-	-	7s. 6¾d.
60.	-	-	£11 9s. 0½d.	70.	-	-	3½d.
61.	-	-	£19 5s. 2d	71.	-	-	6s. 6¾d.
62.	-	-	£2 15s. 1d.	72.	-	-	5s. 10½d.
63.	-	-	£21 18s. 1¾d.	73.	-	-	$564.08
64.	-	-	$127.133 +	74.	-	-	$1132.90

In examples like the two last, some compute the interest on the whole sum to the time of the first payment and add it to the principal, and then deduct the payment; then they compute the interest on the remainder to the time of the second payment, and add it to the principal, and deduct the payment again; and so on. This is not a just method, if simple interest only is allowed, for if the payments were made annually, it would be compound interest; and if they were made oftener, it would be more than compound interest.

Answers to the examples in Circulating Decimals, page 209 *and* 210.

.555 &c. $= \frac{5}{9}$

.666 &c. $= \frac{6}{9} = \frac{2}{3}$

.777 &c. $= \frac{7}{9}$

.888 &c. $= \frac{8}{9}$

.999 &c. $= \frac{9}{9} = 1$

.533 &c. $= \frac{5}{10} + \frac{3}{90} = \frac{48}{90} = \frac{8}{15}$

.466 &c. $= \frac{4}{10} + \frac{2}{30} = \frac{14}{30} = \frac{7}{15}$

.388 &c. $= \frac{7}{18}$

.3744 &c. $= \frac{37}{100} + \frac{4}{990} = \frac{337}{900}$

$.46355$ &c. $= \frac{463}{1000} + \frac{5}{9000} = \frac{1043}{2250}$

$.\dot{2}\dot{4} = \frac{24}{99} = \frac{8}{33}$

$.\dot{4}\dot{2} = \frac{42}{99} = \frac{14}{33}$

$.5\dot{3}\dot{7} = \frac{5}{10} + \frac{37}{990} = \frac{266}{495}$

$.474\dot{5} = \frac{47}{100} + \frac{45}{9900} = \frac{4698}{9900} = \frac{783}{1650}$

$.\dot{8}37\dot{4} = \frac{8374}{9999}$

$.47647\dot{5} = \frac{47}{100} + \frac{647}{99000} = \frac{476}{999}$

Miscellaneous Examples, page 211.

1.	- -	1s. 4d.	5.	- -	3s. 2d.
2.	- -	4s. 3d.	6.	- -	£1 12s.
3.	- -	11d.	7.	- -	15s. 2d.
4.	- -	3s. 2d.	8.	- -	17s. 10d.

9. 4s. 5d.
10. £1 6s. 1d.
11. £2 9s. $9\frac{4}{7}$d.
12. £2 12s. $3\frac{5}{8}$d.
13. 2 cwt. 1 qr. 21 lb.
14. £2 13s. $8\frac{1}{5}$d.
15. 2 cwt. 3 qrs. $24\frac{1}{3}$ lb.
16. 2 cwt. 1 qr. $9\frac{4}{7}$ lb.
17. 46 galls. $1\frac{1}{5}$ qt.
18. { 1 coat 1 yd. 3 qrs. $1\frac{3}{7}$nl. / 13 coats 23 yds. 3qrs. $2\frac{4}{7}$ nls.
19. £65 3s. 4d.
20. £17 1s. $1\frac{1}{8}$d.
21. In this example, I first multiply by $54 = 6 \times 9$, and then subtract $\frac{1}{5}$ of £56 9s. 7d. from the product. I then divide the whole by $18 = 3 \times 6$

£	s.	d.	
56	13	8	
		9	
510	3	0	
		6	
3060	18	0	
—11	6	$8\frac{4}{5}$	$= \frac{1}{5}$ of £56, &c.
3049	11	$3\frac{1}{5}$	(6
508	5	$2\frac{16}{30}$	(3

£169 8s. $4\frac{76}{90}$d. Ans.

22. £1650 18s. 5d.
23. £5 8s. $0\frac{8}{21}$d.
24. £3 0s. $2\frac{10}{13}$d.
25. £39 11s. $2\frac{3968}{4235}$d.
26. $103\frac{4}{5}$ ft.
27. 17h. 12 min.
28. $11\frac{1}{3}$ days.
29. They meet on the next day after their departure at 9h. $50\frac{10}{23}$ min. morn. The distance from Boston $127\frac{37}{69}$ miles, and from New York $122\frac{32}{69}$ miles.
30. A $17\frac{11}{12}$. B $14\frac{11}{12}$
31. $11\frac{1}{4}$ oz.
32. 390 men
33. 10 days
34. $15\frac{12}{13}$ oz.
35. $4\frac{1}{2}$ yds.
36. $9\frac{1}{14}$ months
37. $4166\frac{2}{3}$ yds. of shalloon
38. $202\frac{41}{52}$ quarters.

39. 20 men

40. If 7 men can build 36 rods in 3 days, they can build 12 rods in 1 day, and 168 rods in 14 days. If 7 men can build 168 rods, 20 men can build 480 rods in the same time. Ans. 480 rods.

41. $19\frac{4}{5}$ bushels

42. $125.917+

43. In questions like this and some of the preceding, where there are several conditions, it is necessary to take one condition at a time, and solve the question with regard to each separately.

If 18 men can build a piece of wall in 15 days, how many days will it take 20 men to build the same wall? It would take them $13\frac{1}{2}$ days.—If 20 men can build 40 rods of wall in $13\frac{1}{2}$ days, how long will it take them to build 87 rods of the same kind? It would take them $29\frac{2}{8}\frac{9}{0}$ days.—If 20 men can build 87 rods of wall 5 feet high in $29\frac{2}{8}\frac{9}{0}$ days, how long will it take them to build the same number of rods 8ft. high? It would take them $46\frac{4}{8}\frac{9}{0}$ days.—If 20 men can build a wall 4 feet thick in $46\frac{4}{8}\frac{9}{0}$ days, how many days will it take to build one 5 ft. thick? It will take them $58\frac{2}{4}\frac{9}{0}$ days.

It is, however, less trouble to represent the several conditions as follows:

The first condition is with regard to the number of men. 20 men will do it in $\frac{1}{2}\frac{8}{0}$ of the time that 18 men would do it. This may be represented thus, $\frac{15 \times 18}{20}$. It would take $\frac{8}{4}\frac{7}{0}$ as long on account of the length; this is expressed thus, $\frac{15 \times 18 \times 87}{20 \times 40}$. It would take $\frac{8}{5}$ as long, on account of the height. This is expressed thus, $\frac{15 \times 18 \times 87 \times 8}{20 \times 40 \times 5}$. It

would take $\frac{5}{4}$ as long, on account of the thickness. This is expressed thus, $\frac{15 \times 18 \times 87 \times 8 \times 5}{20 \times 40 \times 5 \times 4}$

This may be reduced before the operation is performed; the 15 in the numerator and 20 in the denominator are divisible by 5; 18 and 4 are divisible by 2; 5 and 5 are divisible by 5; 8 and 40 are divisible by 8. Performing these divisions, the fraction becomes $\frac{3 \times 9 \times 87 \times 1 \times 1}{4 \times 5 \times 1 \times 2}$.

Multiplying the numbers, the numerator becomes 2349, and the denominator 40, and the fraction stands thus $^{2}\frac{3}{4}\frac{4}{0}\frac{9}{} = 58\frac{29}{40}$ as before. Ans. $58\frac{29}{40}$ days.

44. $948.88\frac{8}{9}$
45. 2808 quarters
46. 168 tailors
47. 60 measures
48. 432 tiles
49. 160632 bricks
50. 14400 shingles
51. 994 ft.
52. $51.10\frac{1}{9}$
53. $0.505 —
54. $13.09
55. $23.83
56. The gain was $10.49. It is nearly $2\frac{4}{10}$ per cent. on $437.45
57. $29.99
58. See book.

59.

yrs.	5 rates	6	yrs.	5 rates	6
1	1.05000	1.06000	11	1.71034	1.89830
2	1.10250	1.12360	12	1.79585	2.01220
3	1.15762	1.19102	13	1.88565	2.13293
4	1.21551	1.26248	14	1.97993	2.26090
5	1.27628	1.33822	15	2.07893	2.39656
6	1.34009	1.41852	16	2.18287	2.54035
7	1.40710	1.50363	17	2.29202	2.69277
8	1.47745	1.59385	18	2.40662	2.85434
9	1.55132	1.68948	19	2.52695	3.02560
10	1.62889	1.79085	20	2.65329	3.20713

60. $2.322

61. $94.35

62. $1179.915

63. 1135.88

64. $1753 +. The principal is doubled in 11 years, 10 months, and between 21 and 22 days.

65. To answer this question, the best way is to find the amount of the whole sum for the whole time, and then to find what each of the payments would amount to from the time they were made, until the 8th of July, 1822; and deduct them from the whole amount. Ans. $846.247.

66. The amount of £1 for 5 years, at six per cent. according to the table, is £1.33822; computing the interest on this for 3 months, and adding it, it amounts to £1.35829. £17 13s. 6d. = £17.675.

$$1.35829 \times 17.675 = 24.008 —$$

Ans. £24 0s. 2d.

67. - - $282.875
68. - £229 9s. 6d.
69. - - $0.47
70. - - $0.094\frac{4}{45}$
71. - - $1.484\frac{3}{13}$
72. - - $0.75\frac{6}{13}$
73. - - $58\frac{3}{4}$ galls.
74. - - $19\frac{5}{13}$ galls.
75. - - See book
76. - - See book
77. See book

78. 10 galls. of the cheaper to 25 of the dearer; or 2 of the cheaper to 5 of the dearer.

79. 5 lb. at 10 cents, 2 lb. at 13 cents, and 2 lb. at 16 cents

80. 2 parts water to 13 of rum

81. 6 " at 9s., 1 at 7s., 1 at 5s., and 3 of water
Or 1 part at 9s., 6 at 7s., 3 at 5s., and 1 of water
Or 6 parts at 9s., 6 at 7s., 3 at 5s., and 4 of water
Or 6 " at 9s., 7 at 7s., 1 at 5s., and 4 of water

82. See book

83. 20 bu. of barley, and $61\frac{9}{11}$ of oats

84. $32\frac{1}{4}$ galls.

85. A's loss $80\frac{140}{467}$ tons
B's loss $54\frac{282}{467}$ tons
C's loss $15\frac{45}{467}$ tons

86. These fractions reduced to a common denominator are $\frac{300}{600}$, $\frac{200}{600}$, $\frac{150}{600}$, and $\frac{12}{600}$. Rejecting the denominators, the numerators show the proportions. The sum of the numerators is 77.

The wife's share is $\frac{300}{77}$ of the whole sum = $4675.32\frac{36}{77}$
The eldest son's share $\frac{200}{77}$ = $3116.88\frac{24}{77}$
The second son's " $\frac{150}{77}$ = 2337.66$\frac{18}{77}$
The daughter's " $\frac{12}{77}$ = 1870.12$\frac{6}{77}$

In this example much labour may be saved after finding the wife's share, by observing that the eldest son's share is $\frac{2}{3}$ of the wife's share, the second son's $\frac{1}{2}$ of it, and the daughter's $\frac{2}{5}$ of it.

87. A should pay $\$16.44\frac{4}{9}$
B " $\$20.55\frac{5}{9}$

88. A's share $\$116.66\frac{2}{3}$
B's " $\$133.33\frac{1}{3}$

89. A 1 guinea, 15s. $6\frac{540}{1047}$d.
B 2 guineas, 8s. $6\frac{558}{1047}$d.
C 5 guineas, 5s. $3\frac{819}{1047}$d.
D 10 guineas, 12s. $7\frac{663}{1047}$d.

90.* One of the 1st class should pay $\$39.09$
2d " 12.167
3d " 8.046
4th " 4.841
5th " 2.219

91. To find A's proportion,

$$\pounds 150 \times 7 = 1050$$
$$\pounds 100 \times 5 = 500$$
$$\pounds 270 \times 6 = 1620$$
$$3170 = \text{A's proportion}$$

In the same manner find the proportions of B and C.

$$A = 3170$$
$$B = 3770$$
$$C = 8560$$
$$15500$$

They must share the gain as follows:

A $\frac{3170}{15500}$ of it $= \pounds 92$ 0s. $7\frac{3}{4}$d.
B $\frac{3770}{15500}$ " $= \pounds 109$ 9s. $0\frac{1}{4}$d.
C $\frac{8560}{15500}$ " $= \pounds 248$ 10s. 4d.

92. *Rule for Compound Fellowship.* Multiply each man's stock by the time it is employed; each of these pro-

* This answer is what each should pay for the whole time. First find the price of 14 weeks, and divide between the 10; then of 3 weeks and divide by 14, &c

ducts being made the numerator of a fraction, of which their sum is the denominator, will express each man's proportion of the stock to be divided.

93. - - 15 months
94. - - 24 months
95. - - 120 months
96. - 1738 months
97. - - 8 months
98. - - $5\frac{17}{23}$ months
99. - - 16 months
100. - - 3 months
101. - - $7\frac{14}{23}$ months
102. - - $38\frac{11}{20}$ months
103. - $5\frac{1}{13}$ months
104. - - 8 months
105. - - 6 months
106. - - 8 months
107. - $4\frac{1}{3}$ months
108. - - $723.488
109. - - $691.542
110. - $151.06
111. - $11.276
112. - $79.064

113. $560.173

114. A's $15. B's $35

115. Son's share $5468.75
Wife's " 7031.25

116. 3 h. 45 min. morn.

117. 45 and 50

118. $2\frac{2}{3}$ days

119. $1\frac{7}{9}$ day

120. The first could build $\frac{1}{8}$ of it in a day, the second $\frac{1}{10}$, and the third $\frac{1}{15}$ of it. They would altogether do $\frac{37}{120}$ of it in a day; and it would take them $3\frac{9}{37}$ days to do the whole. Ans. $3\frac{9}{37}$ days

121. They both together consumed $\frac{1}{15}$ of it in a day; the woman alone consumed $\frac{1}{27}$ in a day; the man alone consumed the difference between $\frac{1}{15}$ and $\frac{1}{27}$, which is $\frac{4}{135}$. It would last the man alone $33\frac{3}{4}$ days

122. $1\frac{3}{17}$ week

123. 1 h. 59 min. $37\frac{17}{19}$ sec.

124. 9 and 16

125. The elder had $8750
The younger $6250

126. Wife's share $13333.33⅓
Son's " $17333.33⅓
Daughter's $13333.33⅓

127. Take out $500, and then A's share will be equal to B's: add $300, and C's share will be equal to B. Divide this into three equal parts, and one of the parts will be equal to B's share. Having B's share, it will be easy to find the others

A's share $12700
B's " 11600
C's " 11600

128. Sheep $8
Cow $18
Ox $36

129. 12 calves
6 sheep

130. 7 oxen, 14 cows, 42 sheep

131. Rye 5s.; wheat 8s. per bushel

132. The tallow and hide came to $7.99; this subtracted from $50 leaves $42.01 for the value of the meat. The hind quarters together weighed 440 lb.; at ½ a cent per lb. they would come to $2.20. This subtracted from 42.01 eaves $39.81. If this be divided by 873, the weight of all the quarters, it gives $0.0456 nearly, which is the price per lb. of the fore quarters. The hind quarters are ½ cent per lb. more, which is $0.0506

Price of A's quarter $10.9802
" B's " 11.2889
" C's " 9.7584
" D's " 9.9864

133. A's quarter at 6½ cents per lb. comes to $14.105; B's to $14.495; C's, at 6 cents, comes to $12.84; D's to $13.14. The sum of these is $54.58. A must pay $\frac{14105}{54580}$

of $12.01; B $\frac{144}{345}\frac{25}{80}$; C $\frac{120}{345}\frac{48}{80}$; D $\frac{131}{345}\frac{40}{80}$——A's share is $10.857; B's $11.156; C's $9.883; and D's $10.114.

134. The horse is worth 9 parts, and the saddle 1 part of $150. That is, the horse is worth $\frac{9}{10}$, and the saddle $\frac{1}{10}$ of it. Ans. Horse $135, the saddle $15

135. There are 9 cattle to 20 sheep. $\frac{9}{29}$ of the whole are cattle, and $\frac{20}{29}$ sheep. Ans. 54 cattle, and 120 sheep

136. To 1 ox, there were 3 cows and 6 sheep. $\frac{1}{10}$ of them were oxen, $\frac{3}{10}$ cows, and $\frac{6}{10}$ sheep. Ans. 8 oxen, 24 cows, 48 sheep

137. Say the fourth has 2 parts, the third 3 parts, the second 5 parts, and the first 10 parts; then the fourth will have $\frac{2}{20}$ of the whole, the third $\frac{3}{20}$, the second $\frac{5}{20}$, and the first $\frac{10}{20}$. Ans. The share of the first is $6500; of the second $3250; of the third $1950; and of the fourth $1300

138. Since B is to have 15 crowns more than A, take out 15 for B, and they have equal shares in the remainder. C is to have $\frac{1}{5}$ of both their sums added together, that is, $\frac{1}{5}$ of twice the share of A, and $\frac{1}{5}$ of 15 besides. Take out $\frac{1}{5}$ of 15, which is 3, and then he is to have of the remainder $\frac{1}{5}$ of what A and B have of it. 15 and 3, which is 18, taken from 324 leave 306; of this say A and B together are to have 5 parts and C 1 part; that is, A and B together are to have $\frac{5}{6}$ and C $\frac{1}{6}$ of 306 crowns. $\frac{1}{6}$ of 306 is 51, and $\frac{5}{6}$ is 255. $\frac{1}{2}$ of 255 is 127$\frac{1}{2}$; this is A's share; 15 added to this makes 142$\frac{1}{2}$; this is B's share. 3 added to 51 makes 54; this is C's share. Ans. A took 127$\frac{1}{2}$ crowns, B 142$\frac{1}{2}$, and C 54

139. Each person owns $\frac{4}{32}$ of the whole. A sold $\frac{3}{32}$ and had $\frac{1}{32}$ left. B sells 2 of his shares, which are divided equally among the other shares; there are now only 30 shares, and they are equal as before; therefore A owns $\frac{1}{30}$ of the whole

140. C took $\frac{12}{44}$, that is, $\frac{9}{33}$ of the whole gain; therefore he must have put in $\frac{9}{33}$ of the whole stock, and A and B to-

gether $\frac{2}{3}\frac{3}{2}$. A and B together put in $115; this is $\frac{3}{3}\frac{3}{2}$ of $160, which is the whole stock; of this C put in $45

141. See book

142. 1 cord, 1 ft. 1′ 8″

143. 306 ft. 11′ 4″

144. 2 cords, 5 ft. 7′ 5″

145. $1.203125

146. See book

147. $\frac{2}{3} = \frac{8}{12}$, and $\frac{3}{4} = \frac{9}{12}$; their ages are to each other in the proportion of 8 and 9; that is, the age of the younger is $\frac{8}{9}$ of the age of the elder; therefore 10 must be $\frac{1}{9}$ of the age of the elder. Ans. Younger 80, and the elder 90 years.

148. Observe that the third had $\frac{1}{2}$ as much as the first. The second had as much as the third and fourth, that is, $\frac{1}{2}$ as much as the first, and 5 cents; the first had as much as the second and fourth, that is, $\frac{1}{2}$ of the first, and 5 cents, and 5 cents again; or $\frac{1}{2}$ of itself and 10 cents. Therefore 10 cents is $\frac{1}{2}$ of the first. Ans. The first had 20 cents, the second 15, the third 10, and the fourth 5

149. $\frac{1}{6}$ of A's and $\frac{1}{4}$ of B's are equal to 13; multiplying by 4, $\frac{4}{6} = \frac{2}{3}$ of A's and once B's are equal to 52. Again, $\frac{1}{6}$ of A's and $\frac{1}{2}$ of B's are equal to 16; multiplying by 2, $\frac{2}{6} = \frac{1}{3}$ of A's and once B's are equal to 32. 20 then is the difference between $\frac{1}{4}$ and $\frac{2}{3}$ of A's age. The difference between $\frac{1}{4}$ and $\frac{2}{3}$ is $\frac{5}{12}$. 20 is $\frac{5}{12}$ of 48, the age of A. $\frac{1}{6}$ of 48 is 8. 8 and 5 are 13; therefore 5 is $\frac{1}{4}$ of B's age. Ans. A's age 48 years; B's 20

150. Both together were $400; $\frac{1}{4}$ of the first, and $\frac{1}{3}$ of the second were $120; multiplying by 3, $\frac{3}{4}$ of the first and once the second together were equal to $360; taking this from $400, there remains 40 for $\frac{1}{4}$ of the first. Ans. First $160, and the second $240

151. The whole of the money of the second, and $\frac{1}{3}$ of that of the first is $4200; multiply the first condition by 3,

the whole of the money of the second, and three times that of the first is $12600; taking $4200 from this, there remains $8400; this is the difference between $\frac{1}{5}$ of the first and three times the first; that is, $\frac{14}{5}$ of the first. $8400 is $\frac{14}{5}$ of $3000, which is the money of the first. Ans. The first had $3000, and the second $3600

152. He bought 4 at 2 cents each, as often as he bought 3 at 3 cents each. 4 at 2 cents came to 8 cents, and 3 at 3 cents came to 9 cents; therefore every 7 lemons cost 17 cents, which is $2\frac{3}{7}$ cents each. He sold them at $2\frac{1}{2}$ cents each. The difference between $2\frac{3}{7}$ and $2\frac{1}{2}$ is $\frac{1}{14}$. He gained $\frac{1}{14}$ of a cent on each lemon, that is 1 cent on 14 lemons. To gain 25 cents, he must have had 25 times 14 lemons. $\frac{4}{7}$ of them cost 2 cents, and $\frac{3}{7}$ cost 3 cents each. Ans. 350 lemons

153. $8\frac{1}{4}$ barrels

154. He received five times as much as he spent, and then he had 200 dollars; if he had received as much as he spent, he would have had as much as he had at first, viz. $100. The other $100 then must be four times what he spent. Ans. $25

155. Each son had $\frac{5}{22}$ of the whole estate, and each daughter $\frac{4}{22}$ of it. The two sons together had $\frac{10}{22}$, and the three daughters $\frac{12}{22}$; the difference is $\frac{2}{22}$. $1000 therefore is $\frac{2}{22}$, and $500 is $\frac{1}{22}$ of the whole estate. Ans. The share of a son was $2500

156. Take $\frac{1}{3}$ of the whole for the wife, and $\frac{1}{3}$ for the son. Then, of the other $\frac{1}{3}$, the daughter has 3 parts, and the wife 1 part, that is, the daughter has $\frac{3}{4}$ of $\frac{1}{3} = \frac{3}{12}$ of the whole. The son had $\frac{4}{12}$. The difference is $\frac{1}{12}$. Therefore $1000 is $\frac{1}{12}$ of the whole. Ans. The wife had $5000; the son $4000; and the daughter $3000

157. If he had bought 3 less for the same money, the price of each orange would have been once and one half as

much; consequently, if he had bought the same number at the latter price, they would have come to $37\frac{1}{2}$ cents. Three oranges then would have come to $12\frac{1}{2}$ cents. Hence 3 oranges must have been $\frac{1}{3}$ of the number that he bought. Ans. He bought 9 oranges, at $2\frac{7}{9}$ cents each

158. Say the first had 6 parts, the second 4 parts, and the third 3 parts. The first had $\frac{6}{13}$, the second $\frac{4}{13}$, and the third $\frac{3}{13}$. The second and third together had $\frac{7}{13}$ of the whole. \$1500 is $\frac{7}{13}$ of the whole, which is \$2785.71$\frac{3}{7}$. Ans. The first had \$1285.71$\frac{3}{7}$, the second \$857.14$\frac{2}{7}$; and the third \$642.85$\frac{4}{7}$

159. Double the second condition, and say, he had 16 bushels of corn and 20 of rye for \$30; and 48 bushels of corn and 20 of rye for \$54. The difference between \$30 and \$54 (which is \$24) must be the price of 32 bushels of corn, which is \$0.75 per bushel. Ans. Corn \$0.75, and rye \$0.90 per bushel

160. He had travelled 42 parts of the distance, and had 25 parts to travel; that is, he had travelled $\frac{42}{67}$ of the distance, which is 210 miles. Ans. 30 miles per day

161. The second had as much as the first, and $\frac{1}{3}$ as much as the third. Taking the last conditions, the second had 1 part, while the third had 3 parts. The third had as much as the other two; the first part of the second balances one part of the third; then of the other 2 parts, one will balance what the first had, and the other the part which the second had, that was equal to the first. Therefore the first had 1 part, the second 2 parts, and third 3 parts; that is, $\frac{1}{6}$, $\frac{2}{6}$, and $\frac{3}{6}$. \$2000 is $\frac{1}{6}$ of the whole. Ans. The second had \$4000, and the third \$6000

162. When they were married, her age was 1 to his 3; after 15 years, hers is 2 to his 4. It appears that her age was doubled, and his had become $\frac{4}{3}$ of what it was. Hence

her age was 15, and his was 3 times 15 or 45 years when they were married. Ans. Man 45, and wife 15 years

163. $1.35 per gall.

164. A had gained a sum equal to $\frac{1}{4}$ of his stock; he had then $\frac{5}{4}$ of it. B had only $\frac{1}{2}$ as much, that is $\frac{5}{8}$ of his stock, consequently $225, which he had lost, was $\frac{3}{8}$ of his stock. Ans. $600 each

165. If to $\frac{1}{2}$ the body, 16 inches be added, it makes the length of the tail; if to this 16 inches more be added, it makes the body, that is, $\frac{1}{2}$ the body and 32 inches make the whole body. The body then is 64 inches, and the whole 128 inches. Ans. 128 inches

166. If to $\frac{2}{7}$ of the age of C 20 be added, it makes the age of B; if to this 20 be added again, it makes the age of C; that is, 40 and $\frac{2}{7}$ of itself makes the age of C; 40 then is the other $\frac{5}{7}$. 40 is $\frac{5}{7}$ of 56. Ans. B 36, and C 56 years

167. If the second be covered, it will weigh three times the first, that is 36 oz. The cover and the second cup together therefore weigh 36 oz. If the first cup be covered, it will weigh twice as much as the second; therefore if both the cups and the cover be taken together, the first cup and the cover will be $\frac{2}{3}$, and the second $\frac{1}{3}$ of it. The whole together weigh 48 oz.; $\frac{1}{3}$ of this is 16 oz.; this is the weight of the second cup, consequently the cover must weigh 20 oz. Ans. Cover 20 oz. and second cup 16 oz.

168. The first and second do $\frac{7}{9}$ of it, consequently the third does the other $\frac{2}{9}$ of it. The second and third do $\frac{7}{11}$ of it, consequently the first does $\frac{4}{11}$. $\frac{4}{11}$ and $\frac{2}{9}$ are $\frac{58}{99}$. The first and third together do $\frac{58}{99}$ of it, consequently the second does the other $\frac{41}{99}$. Ans. $\frac{41}{99}$

169. The apples cost $\frac{5}{12}$ of a cent each. There were 8 apples to 5 pears. 8 apples cost $\frac{40}{12} = \frac{10}{3}$ cents, and 5 pears cost the same; therefore 8 apples and 5 pears cost $\frac{20}{3}$ of a cent, which will average $\frac{20}{39}$ of a cent apiece. He gained $\frac{19}{39}$

on each, consequently he gained 19 cents on 39. $\frac{8}{13}$ of these were apples, which is 24; this is half what he bought. Ans. He bought 48, and gave 20 cents for them

170. In going once round the dial plate, the minute hand gains 55 minutes or spaces; consequently it would take it $\frac{60}{55} = 1\frac{1}{11}$ minute to gain 1 minute or space, and to gain 35 it would take 35 times as long, that is, $38\frac{2}{11}$ min. Ans. 7 h. $38\frac{2}{11}$ min.

171. This is to divide 12 into 2 parts, in the proportion of 5 and 17. The first part will be $\frac{5}{22}$ of 12. Ans. 2 h. 43 min. $38\frac{2}{11}$ sec.

172. Reducing the fractions to a common denominator $\frac{21}{63}$ of the time past is equal to $\frac{14}{63}$ of the time to come, or the time past equal to $\frac{14}{21}$ of the time to come. $\frac{14}{41}$ of 12 hours will be the time. Ans. 4h. 5 min. 51 $\frac{9}{41}$ sec.

173. He sold $\frac{1}{4}$ of his linen and $\frac{1}{5}$ of his cotton for $12, by which he gained $0.60. Hence this quantity cost him $11.40. Multiplying this condition by 4, all his linen and $\frac{4}{5}$ of his cotton must have cost him $45.60. Subtracting this from $50, the price of the whole, there remains $4.40 for the price of $\frac{1}{5}$ of the cotton. The cotton cost $22; consequently the linen cost $28; 5 times 22 are 110, the number of yards of the cotton; 3 times 28 are 84, the number of yards of linen. Ans. 110 yds. of cotton, and 84 yds. of linen.

174. A's share is $\frac{8}{9}$ of B's, and C's share is $\frac{4}{7}$ of B's. The difference between $\frac{8}{9}$ and $\frac{4}{7}$ is $\frac{36}{63}$, therefore the difference between the shares of A and C is $\frac{36}{63}$ of B's share; hence $7500 is $\frac{36}{63}$ of B's share.

Ans. A's share is 11666\frac{2}{3}$, B's 7291\frac{1}{3}$ and C's 4166\frac{2}{3}$

175. Beginning at the end of the 3d year, subtract $150 from 14811\frac{7}{18}$, and the remainder 14661\frac{7}{18}$ is $\frac{5}{4}$ of what it was at the beginning of the year, that is, 11729\frac{1}{2}$. From this subtract $150 again, and the remainder will be $\frac{5}{4}$ of what it was at the beginning of the first year; that is

$9263\frac{1}{4}\frac{3}{7}$. From this subtract $150, and the remainder is $\frac{5}{4}$ of his first stock. Ans. 7290\frac{1}{2}\frac{4}{7}$

176. While the grey-hound takes 3 leaps the hare takes 4, therefore while the grey-hound takes 1 leap the hare takes $1\frac{1}{3}$, and while the grey-hound takes 2 leaps the hare will take $2\frac{2}{3}$ leaps; but the grey-hound leaps as far at 2 leaps as the hare does at 3, therefore in taking 2 leaps he gains $\frac{1}{3}$ of one of of the hare's leaps, that is, $\frac{1}{6}$ at each leap; hence he will overtake her at 6 times 50 or 300 leaps. Ans. 300 leaps

177. If he had worked the whole time, he would have received $90, but he lost $15 out of this. Now the difference between working and being idle was $2 a day. Hence he was idle $7\frac{1}{2}$ days. Ans. $52\frac{1}{2}$ days

178. In 8 years he gets £40 in debt, that is, £5 a year; therefore he spends £5 more than his income. A spends $\frac{4}{5}$ of his, and B spends £5 more than $\frac{4}{5}$. Hence £25 must be $\frac{1}{5}$ of his income. Ans. £125

179. Spouting from his throat he would fill at the rate of $\frac{1}{6}$ of the cistern in an hour, from his right eye he would fill $\frac{1}{48}$ of it in an hour, from his left eye he would fill $\frac{1}{72}$ of it in an hour, from his right foot he would fill $\frac{1}{4}$ of it in an hour. All these together make $\frac{65}{144}$; hence, all spouting together, he would fill $\frac{65}{144}$ of it in an hour; 65 is contained in 144 $2\frac{14}{65}$ times. Ans. 2 h. 12 min. $55\frac{5}{13}$ sec.

180. After the fourth game, twice his money was as much less than 200s. as three times his money was greater than 200s.; hence 200s. was $2\frac{1}{2}$ or $\frac{5}{2}$ his money. 200 is $\frac{5}{2}$ of 80, to that add 20, and it will make what he had at the end of the third game. $80 + 20 = 100$; $\frac{1}{2}$ of 100 or 50 is what he had after the second game. $50 + 10 = 60$ is what he had after the first game, and $\frac{1}{2}$ of 60 or 30 is what he commenced with. Ans. 30s.

181. 15.708ft.

182. 5.41ft.

183—187. See book
188. 24855.412 miles
189. 1035.6 miles
190. 69.043 miles
191. 15 degrees
192. 15 min. of a degree
193. 1 h. 34 min. 52 sec.
194. 4 h. 27 min. 16 sec.
195. 0 h. 36 min. 28 sec. even.
196. 68093 miles nearly
197. 1433.8 miles. Lat. of Boston 42° 23′
198. 2487.45 miles
199. $61.035
200. £34 12s.
201. $160.93
202. 1532 francs, 90⅔ centimes
203. $209.20
204. 246 $\frac{1}{16}$ gelders.
205. $391

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The work is published on a fine paper, and beautiful type; and is, altogether, far superior to any other edition of Virgil in use.

attention to the correction of typographical errors—and in consequence, the accents are often misplaced, the words both Italian and English, so mis-spelled, as to produce important misrepresentations of the sense, and the genders, parts of speech, &c. incorrectly stated. In the American edition, these errors have been carefully corrected, the whole text examined by the folio edition of ALBERTIS, many definitions and idioms added, and the vocabulary itself enlarged by about *two thousand* of the most important words, omitted in the London copies.—To make it more useful, the texts of the classics most commonly read in the schools and by beginners in this country, as the Scelta of Goldoni, the Notti Romane of Verri, the Gerusalemma Liberata, the Tragedies of Monti, and the Italian Reader, compiled for the use of Harvard University, have been consulted, and several hundred words not contained in London editions have been added from them.

The ITALIAN and ENGLISH PHRASE BOOK, or Key to Italian Conversation; containing the chief Idioms of the Italian Language. Improved from M. L'ABBE BOSSUT. Price 37½ cents.

This work is on the same plan with the French Phrase Book by BOSSUT—and is a complete Key to the conversational idioms of the Italian language; and when these idioms are once mastered, the whole language is easily attainable. It cannot fail to be eminently useful to beginners.

COLLECTANEA GRÆCA MINORA; with Explanatory Notes, collected or written by ANDREW DALZEL, A. M. F. R. S. E. Professor of Greek in the University of Edinburgh. Sixth Cambridge edition; in which the Notes and Lexicon are translated from the Latin into English. 1 vol. 8vo. Price $2,25.

Preface to the Sixth Cambridge Edition.

It has long been a complaint, that the notes of Collectanea Græca Minora, being written in Latin, were not so useful as they might be to beginners, for whose use they were prepared. In this edition, therefore, the notes and lexicon have been translated into English; so that the work may be used without any previous knowledge of the Latin language. So numerous are the words and idioms in Latin authors, which may be illustrated by a knowledge of the Greek language, from which they were borrowed, that no reasonable man can doubt that the Greek should be studied first.

In this edition a few notes have been added, particularly upon the most difficult part—the extracts from Tyrtæus. The text also has been diligently compared with the latest and best editions of the works, from which the extracts were made, belonging to the library of Harvard University; and a few new readings have been introduced, which throw light on obscure passages. It is hoped, therefore, that those who have heretofore used and approved the work, will be still better satisfied with it, now that it is more free from errors, and more easy and instructive to young students.

COLLECTANEA GRÆCA MAJORA. Ad usum Academicæ Juventutis accommodata; cum Notis philologicis, quas partim collegit partim scripsit ANDREAS DALZEL, A. M. &c. Editio quarta Americana, ex Auctoribus correcta, prioribus emendatior, cum Notis aliquot interjectis. Cantabrigiæ, Mass. E prelo Universitatis. Sumptibus HILLIARD, GRAY et Soc. Bibliopolarum, Bostoniæ. 2 vols. 8vo. Price $7,00.

Extracts from a Review of this Edition.

The best criterion by which to estimate the value of works designed to facilitate the purposes of education, is actual experiment. The present selections from Greek literature have been many years before the public, and have constantly been coming more widely into use. Of the first volume there have appeared in England and Scotland at least eight, we believe nine, several editions, and five or six of the second; and in the United States, we have now the fourth edition of the whole work from the press of the University at Cambridge. A book, to meet with such success, must be well adapted to its end.

Of all the editions which have thus far appeared in Great Britain or America, we do not hesitate to pronounce this to be the most correct. It exhibits the clearest marks of indefatigable diligence and conscientious accuracy on the part of its learned and unassuming editor. Instead of vague and indiscriminating praise, we will endeavor to explain its peculiar advantages. Our account will be a short one, though the labors which we commemorate extended through years.

The chief object of the American editor, Professor JOHN S. POPKIN of Cambridge, was to make the book a correct one. It had gone through so many editions,

and each new one had repeated so many of the errors of the last, and made so many of its own, that both the text and the notes had become very much disfigured. Not only accents and letters were often wanting, but words, and sometimes whole lines were omitted; especially in the notes. In the third American edition, these were in a good degree amended; in the fourth the same purpose has been most assiduously pursued. To do this the original sources of the notes and text were consulted, and these, together with other good editions of the several writers, were diligently compared. Not a few fractures and dislocations were repaired by means of an early edition of the Collectanea. When the sense was found broken and obscure, it appeared on examination that words, lines, and sometimes several lines had been omitted; particularly where a word was repeated at no great distance, the intervening words were sometimes passed over in printing.

We hope we have said enough to justify our preference of Professor POPKIN's edition of the Græca Majora over any other. To give a more distinct idea of what he has accomplished, we venture to affirm, after a close computation which may be relied upon, that of errata in the copy greater and less, he has corrected as many as ten thousand. If after all his care and pains, he has made any or left any, they can be easily marked and corrected, as the present edition has been made on stereotyped plates. It was an undertaking of long and toilsome diligence to correct the press and the copy of a work of this kind, collected from so many sources, and referring to so many authorities.

Not less than five hundred volumes were of necessity consulted.

An EPITOME of GRECIAN ANTIQUITIES. For the use of Schools. By CHARLES D. CLEAVELAND. Price $1,00.

To the Publishers.

I received a few days since your letter of inquiry concerning the "Epitome of Grecian Antiquities," and am happy in the opportunity of expressing an opinion of that little work.—While it was in progress the plan received my full approbation; and the diligence of the compiler in procuring and consulting all the proper authorities and the unusual care bestowed in superintending the publication led me to expect a well executed work. In this I have not been disappointed. POTTER's Archæologia Græca is voluminous and expensive, and the works of ROBINSON and Bos have not been re-published in this country. Some work of the kind is absolutely necessary for the classical student in every stage of his progress. In this state of things Mr. CLEAVELAND's well digested manual supplies a deficiency and obviates an objection, which has heretofore existed, to making Grecian Antiquities a separate and particular study in our Academies and Classical Schools.

WILLIAM CHAMBERLAIN,
Professor at Dartmouth College.

In Press. GROVES'S GREEK LEXICON. A Greek and English Dictionary. By the Rev. JOHN GROVES. With additions, by the American editor.

The object of the compiler of this work (as stated in his Preface) was, to offer to the public a *Dictionary*, which young Greek scholars could use with ease and advantage to themselves; but sufficiently full to be equally serviceable as they advanced; a book, that would answer for School, for College, and more particularly for reading the New Testament and the Septuagint.

In the arrangement of the words, the alphabetical method has been adopted, as best suited to the capacity and diligence of the young learner. Immediately after each word is placed its form of declension or conjugation, together with any peculiarity attending it, such as the attic genitive of contracted nouns, the future or perfect of any dialect peculiar to certain verbs, &c. Next is placed the derivation or composition of the word. The English significations of the Greek word follow next. In this part two or three synonyms have been given for each signification. After the significations are subjoined any irregularities or varieties arising from dialect, &c. and some of the more difficult inflexions of each word are added. A considerable number of new words have been introduced. These consist of words occurring in the authors usually read, and in the Septuagint, which are not to be found in Schrevelius. They are also taken from the Greek tragedies now generally read at schools, and from elementary books latterly introduced. All the inflected parts of words which are in Schrevelius are to be found in this Dictionary, with many others. These consist of oblique cases of nouns, pronouns, and participles; of persons, tenses, moods, &c. of verbs. There is no English attached to these parts and inflexions, but a reference is given to the theme, where all the significations will be found. This part of the work has been particularly attended to

where it respects the New Testament; and thus the work will be useful both to beginners and to those persons who may wish to revive their knowledge of Greek, especially of the New Testament; they will also find in this Dictionary all the words occurring in the Septuagint. Every thing has been retrenched that did not coincide with the young scholar's capacity; and he has here given to him what he will notice at present, instead of what he may look for at a more advanced period of his studies; he has here laid before him what will be immediately useful, for what might be serviceable hereafter.

This American edition, in conformity with the plan of the work, will be improved by the addition of considerable supplementary matter particularly adapted to the wants of younger students, for whose use the work is principally designed.

Will speedily be Published. HOMER'S ILIAD, with English Notes. In 2 vols. on the plan of GOULD'S edition of Virgil, Ovid, Horace, &c.

ELEMENTS of LOGIC, or a Summary of the General Principles and Different Modes of Reasoning. By LEVI HEDGE, LL. D. Professor of Natural religion, Moral Philosophy, and Civil Polity, in Harvard University. *Stereotype edition.* Price 87½ cents.

Professor HEDGE made his Logic after twenty years experience in teaching the science. His object was to form a system adapted to the present improved state of intellectual philosophy. The Logics before in use were deficient in parts of primary importance. The instruction they furnish on the article of reasoning is almost exclusively confined to the principles of sylogism. They contain very little relating to moral evidence and those modes of reasoning by which the practical business of life is carried on. The success which has attended the sale of HEDGE'S Logic is ample proof that it is suited to the wants of the community. It has superseded those before used in most, if not all, the Colleges in New England and in several of those in the middle, southern, and western states. It is also extensively used in Academies and Schools of the higher order, in various parts of the United States. In the different editions this treatise has been carefully revised by the author, and in the fourth edition two chapters were added, containing the principles of controversy—and a body of rules for the interpretation of written documents.

JOHNSON'S DICTIONARY of the English Language, as improved by TODD, and abridged by CHALMERS, with WALKER'S Pronouncing Dictionary combined;—to which is added, WALKER'S KEY to the Classical Pronunciation of Greek, Latin, and Scripture Proper Names. Edited by JOSEPH E. WORCESTER, A. M., A. A. S., &c. 1 vol. 8vo. Price $5,25.

This Dictionary comprises a complete reprint of Mr. Chalmers's Abridgment; Mr. Walker's Principles of English Pronunciation, his Pronunciation of all the words found in his Dictionary, together with his Critical Remarks on the pronunciation of particular words; and also Walker's Key entire.

It possesses the following advantages, not found in the three works above mentioned, of which it is chiefly composed.

1. The words added by Mr. Todd, exceeding fourteen thousand in number, are discriminated from the rest.
2. Words pronounced obsolete by Dr. Johnson or Mr. Todd, are so marked.
3. Words designated by Dr. Johnson or Mr. Todd as primitive words, are distinguished from such as are derivative.
4. Additional matter or remarks, etymological, critical, and explanatory, from Dr. Johnson and Mr. Todd, are occasionally inserted.
5. To the many thousand words not found in Mr. Walker's Dictionary, the pronunciation has been given according to his Principles.
6. With regard to the Pronunciation of many words, respecting which other orthoepists differ from Walker, and he has neglected to exhibit this difference, the mode adopted by others is here given.
7. An Appendix, containing besides other matter, all the further additional words, (about one thousand,) inserted by Mr. Todd in his second edition, published in London in 1827.
8. Dr. Johnson's Preface to his folio edition, and Mr. Todd's Introduction.
9. An alphabetical list of the Authors referred to as authorities for the use of words, with the time specified when they flourished.

ILLUSTRATIONS of PALEY'S NATURAL THEOLOGY, with Descriptive Letter Press. By JAMES PAXTON, Member of the Royal College of Surgeons, London. 1 vol. 8vo. Price $2,75.

"Of muscular actions, even of those well understood, some of the most curious are incapable of popular explanation, without the aid of Plates and Figures."—*Paley's Theology, Chap.* ix.

PALEY'S Natural Theology has long been held in high estimation as a work eminently useful to young persons both for the quantity and clearness of the information it imparts, and the valuable deductions and conclusions which the author establishes in the progress of his work. But every person not previously conversant with the subject must have felt the want of some figures, some delineations for the eye, in order to comprehend fully the subjects treated of. These illustrations are beautifully executed in thirty six lithographic plates, large octavo size, with descriptive letter press; and render very clear the different mechanical functions of the bones, muscles, arteries, veins, viscera, &c. of animals, and many similar and curious operations in the vegetable kingdom. It is an indispensable accompaniment to one of the best books in the English language.

In Press. A GRAMMAR of the ITALIAN LANGUAGE, with Exercises. By PIETRO BACHI. Instructer at Harvard University. 12mo.

This book has been compiled from the best Grammars of the Italian tongue, extant in Italian, English, and French, special use having been made of Barberi's celebrated "Grammaire des Grammaires Italiennes." It is divided into four parts, Pronunciation, Orthography, Analogy, and Syntax. The pronunciation is more fully treated than in any other Grammar, and illustrated by English combinations of letters representing the Italian sounds. Every Italian word is accented throughout the book, so that the pupil grows familiar with the genius of the language in this respect, while he is acquiring a knowledge of its grammatical structure. The verbs are given with unusual fulness, and the irregular verbs are arranged and exhibited after a new method very convenient for reference.—The rules of the Syntax are supported by examples carefully cited from the best writers, and followed by appropriate exercises. A copious Alphabetical Index closes the volume.

In press, and will soon be published. JUVENAL'S SATIRES, with English Notes. An expurgated edition of the Satires of Juvenal, with copious English Notes, after the plan of Gould's edition of Virgil. By the editor of Greek Delectus, Phædrus, &c.

IRVING'S ELEMENTS of ENGLISH COMPOSITION; serving as a sequel to the study of Grammar. By DAVID IRVING, LL. D. Author of the Lives of the Scottish Poets. Second American from the sixth London edition. Price $1,25.

Extracts from the Preface.

Though it was my principal object to treat of prose composition, yet a few observations on poetry incidentally occur. The remarks which have been suggested with regard to the nature of figurative language, apply equally to prose and to poetry; but the poets have furnished me with the most copious and beautiful illustrations.

The rules of criticism are more successfully inculcated by particular examples than by general precepts. I have therefore endeavored to collect abundance of apposite quotations, in order to illustrate every branch of the subject.

An INTRODUCTION to LINEAR DRAWING; translated from the French of M. FRANCŒUR; with alterations and additions to adapt it to the use of Schools in the United States. To which is added, the Elements of Linear Perspective; and Questions on the whole. By WILLIAM B. FOWLE, Instructer of the Monitorial School, Boston. Price 75 cents.

From the Translator's Preface.

An elementary treatise on Drawing, adapted to the use of common schools, cannot but be well received. Besides the professions which make the art of drawing their particular study, anatomists, naturalists, mechanics, travellers, and indeed all persons of taste and genius, have need of it, to enable them to express their ideas with precision, and make them intelligible to others.

Notwithstanding the great utility of this branch of education, it is a lamentable

fact, that it is seldom or never taught in the public schools, although a very large proportion of our children have no other education than these schools afford. Even in the private schools where drawing is taught, it is too generally the case that no regard is paid to the geometrical principles on which the art depends. The translator appeals to experience when he asserts, that not one in fifty of those who have gone through a course of instruction in drawing, can do more than copy such drawings as are placed before them. Being ignorant of the certain rules of the art, (and they are the most certain because mathematical,) they are always in leading strings, and unless endowed with uncommon genius, never originate any design, and rarely attempt to draw from nature. It is to remedy this defective mode of teaching, that the translator has been induced to present this little work, on the elements of drawing, to the American public.

Preface to the Second Edition.

The favorable reception of the first edition of this Treatise, has induced the Translator to revise it carefully, and to add to it a Second Part, containing the elements of *Perspective Drawing*, to which the First Part is a good introduction.

Questions, also, upon the more important parts of the book are added; and the Translator hopes that this more correct and enlarged edition will meet with the same favor that a liberal public has bestowed upon its predecessor.

The LATIN READER. Part First. From the fifth German edition, by FREDERIC JACOBS, Editor of the Greek Anthology, the Greek Reader, &c. &c. Edited by GEORGE BANCROFT. Stereotype edition. Price 87½ cents.

The Latin Reader, which is here published, was compiled by Professor FREDERIC JACOBS, of Gotha, who having long been engaged in the cares of instruction and the pursuits of a scholar, is in every respect qualified to make judicious selections for the purposes of teaching.

The editor, in publishing this work in America, has been influenced by a sincere belief, that it forms an easy introduction to the language and character of the Roman world. His duties as a teacher led him to the comparison of many similar works now used in England and on the continent. This seemed to him the best; and having already used it in the school with which he is connected, he has found his opinion confirmed by his experience.

This work is very fast taking the place of Liber Primus, Historiæ Sacræ, Viri Romæ, &c.

The advantages of this work are, that it proceeds by gradual and easy steps, from the examples of the first principles of Grammar, usual in Primary books, to the more difficult Latin of the authors to be studied next in course—thus including in *one* volume what commonly occupies two or more. The necessity of adapting the matter to the gradual progress of the pupil has secured a variety of selection, sufficient to keep the attention excited; and thus to obviate the motive for a frequent *change* of works: while the amount of useful knowledge bound up in these pages exceeds that to be found in most other books of the same description.

In the *stereotype* edition, the Dictionary has been new modelled entire. It is of a size commensurate with the text, for which it is designed; and may, for some time, at least, stand the pupil instead of the more cumbrous and expensive works of Entick and Ainsworth—with the additional advantage of being based upon Adam's Latin Grammar; and having the minute irregularities of Declension, Gender, and Tense, and also the component parts of compound words, noted in full, by a gentleman of well known accuracy and judgment.

The LATIN READER. Part Second. Chiefly from the fourth German edition of F. JACOBS, and F. W. DÖRING. Edited by GEORGE BANCROFT. Stereotype edition. Price 75 cents.

The present continuation of the Latin Reader has for its object, to provide a work suited to the purposes of instruction in the Latin language, of a classical character, interesting to the young mind, and conveying useful information. The first part of this little volume contains select fables from Phædrus; these are followed by extracts taken almost entirely from Cicero and Livy; the volume closes with an abridgment of Justin, for the excellence of which the name of Jacobs is alone a sufficient recommendation. Most of the "Short Narrations" were selected by Döring, who acted in concert with Jacobs. A few more have been added from the twelfth German edition of an elementary work, compiled by Bröder. In presenting to the public this edition, it is only necessary to say, that the text has undergone a thorough revision; that uniformity has been introduced in the orthography, which is now made to conform to that of the Latin

Dictionaries in common use; and that equivocal words have been marked with accents in the usual way, and speeches distinguished from the narrative by inverted commas.

The LATIN TUTOR, or an Introduction to the making of Latin, containing a copious exemplification of the rules of the Latin Syntax from the best Authorities. Also rules for adapting the English to the Latin idiom. The use of the particles exemplified in English sentences designed to be translated into Latin. With rules for the position of words in Latin composition. Price 87½ cents.

The object of this work is to furnish the Latin student with a series of exercises adapted to familiarize to his mind the inflexions of words, and the application of the rules to syntax, and to lead him to such a knowledge of the structure of the language as may enable him to read and write it with ease and propriety.

The materials of which it is composed have been drawn from the purest sources, and will be found to possess intrinsic merit in sentiment, clothed in a rich variety of elegant and classical expression, the order and arrangement, it is hoped, will be found correct and perspicuous.

But the principle point on which the claims of this work are rested, is, that it endeavors to present, in every part, a genuine Latin style, in place of that nondescript style, produced by conforming the Latin words to the English collocation, which occupies a considerable proportion of every work on this subject which has fallen within our knowledge.

This work is now used in the Boston Latin School.

LETTERS on the GOSPELS. By Miss HANNAH ADAMS. Second edition. Price 75 cents.

Extract from the Christian Examiner and Theological Review.

We have been very highly gratified by the perusal of this little book, which, coming out with all the modesty, simplicity, and real learning, which distinguish its author, is calculated we think, to be of very important service in the cause of true religion.

We have rarely seen so much valuable knowledge brought in so small a compass, or in so attractive a manner, to the level of youthful minds.

An ABRIDGMENT of MURRAY'S ENGLISH GRAMMAR. Containing also Punctuation, the Notes under rules in Syntax, and Lessons in Parsing. To the latter of which are prefixed, Specimens illustrative of that Exercise, and false Syntax to be corrected. All appropriately arranged. To all which is adapted, a New System of Questions. From the second Portsmouth edition, enlarged and improved. By SAMUEL PUTNAM. *Stereotype edition.* Price 19 cents.

The sale of the former editions of this work has encouraged the editor to offer the public another, containing, as he would hope, some valuable improvements.

The object of the questions interspersed through this Grammar, is to lead the learner, while committing his lesson, to discover its meaning and application.

As many scholars never use any other than the cheap editions of the Grammar, it is certainly important that such an abridgment should contain, if possible, all the necessary rudiments.

There is, among some, a disposition to abandon Murray entirely, and adopt divisions and arrangements altogether new. Every new system will, without doubt, present some new and valuable views. But whether, upon the whole, any single system can at present be found, more scientific, or affording greater facilities in learning to speak and write our language correctly, is greatly to be doubted.

To the Editor.

SIR,—I have examined, with some attention, the third edition of an Abridgment of Murray's English Grammar, published by HILLIARD, GRAY, & Co. Having, for a considerable time, used the former editions of the same work, I was, in some measure, prepared to appreciate this. The lessons in parsing are well chosen and the arrangement of them a valuable improvement. The NEW SYSTEM of QUESTIONS has long been a *desideratum* in an introduction to the English Grammar, and seems perfectly to answer the end designed. In short, I regard this little book as a highly valuable acquisition to our schools; far preferable to any work of the kind that has come under my observation, and am persuaded that your labor in this department of early science will meet all the encouragement you can desire.

I am, Sir, &c. ORANGE CLARK, *Principal*
Portsmouth, June 13th, 1827. *of the Portsmouth Lyceum.*

MURRAY'S INTRODUCTION to the English Reader, or a Selection of Pieces in Prose and Poetry, calculated to improve the Younger Classes in Reading, and to imbue their minds with the love of virtue. To which is added, Rules and Observations for assisting children to read with Propriety. Improved by the addition of a Synonymising Vocabulary, of the most important Words, placed over the sections, from which they are selected, and divided, defined, and pronounced according to the principles of JOHN WALKER. Walker's Pronouncing Key, which governs the Vocabulary, is prefixed to the work. Price 37½ cents.

"This Introduction is full of simple, natural, and interesting pieces. It is we think the best juvenile selection in the English language. It produces moreover a fine animation and an intelligent style of reading, which are great aids to general improvement. The present edition of this useful work, has an important addition to recommend it, as mentioned in the title given above."—*Journal of Education, Vol. 2, No. 9.*

The Introduction to the English Reader is considered the best of Mr. MURRAY'S reading books; and this is no small praise, when the popularity and excellence of them all is considered.

The Introduction now offered to the public is improved by the addition of a vocabulary of the most important and difficult words prefixed to each section, showing their pronunciation and definition. This mode is far preferable to having a general vocabulary appended to the work, which is troublesome to the scholar and therefore apt to be neglected, or, if much recurred to, causes the book to be sooner defaced and destroyed;—and much better than having the pronunciation given in the body of the work, which blurs and disfigures the page and renders the book, to the young, almost illegible.

NEUMAN and BARRETTI'S DICTIONARY of the Spanish and English Languages; wherein the words are correctly explained, agreeably to their different meanings, and a great variety of terms, relating to the Arts, Sciences, Manufactures, Merchandise, Navigation, and Trade, elucidated. Stereotype edition, carefully revised, and enlarged by the addition of many thousand words extracted from the writings of the most Classical Spanish and English Authors, many of which are not to be found in any other Dictionary of those Languages; and also great additions from the Dictionaries of CONNELLY and HIGGENS, the Spanish Academy, &c. To which are added Directions for finding the difference between the Ancient and Modern Orthography, by F. SALES, Instructer of French and Spanish at Harvard University, Cambridge. 2 vols. 8vo.

An INTRODUCTION to SYSTEMATIC and PHYSIOLOGICAL BOTANY. By THOMAS NUTTALL, A. M., F. L. S., &c., Lecturer on Botany and Zoology, and Curator of the Botanic Garden connected with Harvard University, Cambridge. 1 vol. Price $2,00.

The present work forms a happy exception to those Introductory Treatises upon different subjects, which are the offspring of avarice, or of the pride of authorship.

The work is accompanied by twelve very beautiful lithographic engravings; and its entire execution is characterized by neatness and precision.

In conclusion, we would only remark, that it has fully answered the expectations we had formed of it, from a knowledge of the high attainments of its author, and that, in our opinion, it constitutes by far the most valuable treatise that can be put into the hands of a person just commencing this delightful study. To those who are acquainted with Mr. NUTTALL'S former productions, it need not be mentioned, that his style is simple, condensed, and highly perspicuous; precisely what a style ought to be in all works of a similar nature.—*American Journal of Science and Arts.*

The NATIONAL READER; a Selection of Exercises in Reading and Speaking, designed to fill the same place in the Schools of the United States, that is held in those of Great Britain by the compilations of Murray, Scott, Enfield, Mylius, Thompson, Erving, and others. By

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"Induced by esteem for the compiler, as well as by a deep interest for whatever concerns the subject of education, we have examined the National Reader with care, and with satisfaction."

"Finding the work thus deserving of favor, we earnestly recommend it to the adoption of all teachers of youth who desire to instil into their pupils a taste for moral and literary beauty, and a love of country."—*National Intelligencer, Oct.* 11, 1827.

"The National Reader is designed for the *common schools* of the United States, but it will be found a valuable introduction to the First Class Book in those higher institutions in which that work is used. After carefully and thoroughly examining this compilation, we confidently and with pleasure recommend it to the notice of teachers, school committees, and all others interested in the education of the young. The selection of lessons is peculiary rich, and sufficiently diversified."—"We could not easily name a book of equal size which contains so great a variety of classically chaste and interesting matter; and we think it well worthy of a place in every parlor as a volume of elegant extracts."—*American Journal of Education, Oct.* 1827.

"This is one more added to the many fine selections for schools which have been published within a few years."—"The National Reader contains a suitable proportion of extracts from our own writers, both in poetry and prose, and is manly enough not to think it anti-national to borrow from the stores of England. We do not know that a better book of the kind could be made."—*Christian Examiner, Sept. and Oct.* 1827.

"We are anxious to add our feeble testimony to the excellence of this compilation. It is a volume calculated to fill a high and an important place in our schools. The selections are made chiefly from American writers of high standing, and they are happily adapted to convey useful information, to improve the taste, to interest the feelings, and to leave the best moral and religious impressions. We were exceedingly pleased to observe its serious character; and we should think that no one could attentively peruse it, without being the wiser and better; without being more sensible of his obligations to be virtuous and devout; without a deeper conviction that he is immortal and responsible. We are fully persuaded that, where it is used in schools, it cannot fail to produce the most desirable effect on the dispositions and conduct of the youth."—"In preparing this volume the compiler has conferred a favor on the community, which we trust they will cheerfully acknowledge by extensively introducing it into their schools."—*Greenfield Gazette and Franklin Herald, Dec.* 1827.

Our limits do not permit us even to make extracts from the highly favorable notices which have been taken of the National Reader by the *Christian Intelligencer and Eastern Chronicle* of Maine, the *Courier*, *Statesman*, and *Galaxy* of Boston, the *Troy Sentinel*, the *Western Monthly Review, for Oct.* 1827, and the *Statesman, Daily Advertiser, Albion, Morning Courier, Mirror*, and other journals of New York.

In Press. The AMERICAN SCHREVELIUS, or Greek and English Lexicon, new and improved edition.

The basis of the work is SCHREVELIUS's well known Lexicon; which, on the whole, in the present state of Greek studies in this country, was thought preferable to any other manual adapted to *the use of schools*. Schrevelius's work was more particularly intended for the Old and New Testaments, Homer, Hesiod, Musæus, Theognis, Pythagoras, and other Gnomic Authors, Isocrates, Æsop, &c.; the author also made use of Portus's Ionic and Doric Lexicons and the Lexicon to Pindar and the other Lyric poets. It was published several times on the continent of Europe during the author's life; and within that period was also republished in England by Hill, who enlarged it considerably, more particularly with words from the New Testament, the Septuagint, and the principal poets and orators, as well as the school books of the day. Besides the editorial labor bestowed upon it in England, it has received improvements in France, where a valuable edition of it was published in 1779 by the celebrated scholar Vauvilliers. Of the other editions, we have before us the Italian one in folio, and a German one, reprinted from the Paris copy, at Vienna in 1822, under the editorial superintendence of Kritsch; who justly observes, that the Lexicon, as now published, is very different from the ancient editions both in copiousness and explanations; and, in its present state it may with propriety be recommended to the student in Greek literature. The signi-

fications given in this work are more copious than the Latin ones of Schrevelius. It has been the intention of the editors, that the work should comprehend all the words which are to be found in Professor Dalzel's Collectanea Majora and Minora, Jacob's Greek Reader, and the other books now studied in our schools and other seminaries of learning.

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